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Modern Photography

WITH

Modern Miniature Cameras

by

WILLIAM ALEXANDER

ILLUSTRATED

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ILLUSTRATIONS

NOTE

The illustrations have been selected to show the application of miniature cameras to all kinds of modern photography usually undertaken by to-day's amateur and professional workers. I have deliberately refrained from presenting a lot of stunt or freak pictures ; such being of little value in connexion with the subject of this book.

PREFACE

NOTHING clings so tenaciously to life as tradition; but it is in the throes. Photographers to-day no longer believe that large and heavy apparatus is essential for good photography; not even the studio workers.

Nor do the pleasures of photography terminate with the exposure of a roll of film, or the making of prints from the negatives. Our snapshots form a record of past pleasures, to be lived over again; and if we are a little more seriously inclined, and photograph with an artistic bias, our albums and portfolios become a pictorial history of our mental development and spiritual life.

Remarkable improvements in apparatus and the automatic simplification in its use, with the accompaniment of smaller and still smaller cameras, has brought photography into every home among all classes.

For this reason I wish to make it clear that the frequent references in this book to somewhat expensive outfits and high-grade precision instruments for specialised work must not be taken as inference that the book is for specialists, professionals or people of means only.

There is something for every reader, however modest his aims or restricted his expenditure.

Three or four pounds will buy a first-rate miniature camera with a high-grade anastigmat lens of F 4.5 aperture; another pound or two will provide for a simple but fully efficient enlarger, and this book will show not only how to obtain perfect photographs with them, it will explain clearly how to make money thereby and sufficient profit for a more luxurious outfit if such is desired.

I wish particularly to state that Chapter III contains what are really the key-stone and foundation of perfect miniature camera photography, and I believe it is well worthy of careful reading by all modern photographers whether their photography is confined to snapshotting with a miniature camera on holidays, pursued as an artistic avocation, or used for professional purposes.

Practically all the instruments and accessories mentioned and reviewed in the following chapters have been used and thoroughly tested. Life being short, and other matters nearly as important as miniature camera photography having some claims on an author's time and purse, it has not been possible to examine every small item available.

For the loan of blocks, photographs and specimens I wish to express my sincere thanks to :

Messrs. Agfa Ltd., 1-4 Lawrence Street, London, W.C.2 ; Messrs. Dallmeyer Ltd., 31 Mortimer Street, London, W.1 ; Messrs. R. F. Hunter Ltd., 51 Gray's Inn Road, London, W.C.1 ; Kodak Ltd., Kingsway, London, W.C.2 ; Messrs. E. Leitz, 20 Mortimer Street, London, W.1 ; Messrs. Peeling and Van Neck, 4-6 Holborn Circus, London, E.C.1 ; Mr. A. O. Roth, 85 Ringstead Road, London, S.E.6 ; Messrs. Sands, Hunter and Co. Ltd., 37 Bedford Street, London, W.C.2 ; Mr. R. E. Schneider, 189 The Grove, London, W.6 ; Messrs. Thorsch and Co., 37 Bedford Street, London, W.C.2 ; Messrs. Zeiss Ikon Ltd., 37-41 Mortimer Street, London, W.1.

And my warm appreciation of their unfailing courtesy and kindness in supplying information and details as to last-minute improvements, and permission to reproduce certain illustrations.

WILLIAM ALEXANDER.

Sheffield.
July 1933.

Chapter I

INTRODUCTION; VOGUE OF MINIATURE CAMERAS; ADVANTAGES

MINIATURE cameras annually increase considerably in numbers; their resources are being constantly amplified; and a new and more meticulous technique is called for in their handling if the finest results are desired, and if they are to be exploited to their full capacity.

Comparatively few photographers have yet realised and taken advantage of the special and exclusive facilities available in the more highly equipped models of these small cameras.

Many who have acquired one or other of such instruments, while deriving much pleasure from its use, are unaware of the potentialities and the possible opening up of fresh fields resulting from a thorough and intelligent familiarity with the peculiarities and resources of these cameras.

I believe that a reading of this little book will be for most photographers a revelation, and will result in a great extension of their productions, both as a joy in itself and a profit in the outcome.

There is no need for anyone to be perturbed because, in general, a rigid accuracy in working is strongly advocated; nor at the rather dogmatical tone in which some of the matter is expressed.

It is easy to obtain passable and even fairly good photographs with miniature cameras, without any forethought; with little or no preliminary study; and by taking nothing beyond ordinary care in operation.

At the same time, in this, as in any other pursuit worthy of some attention to important if minor details, the very best results can be achieved only by a rational method of procedure based on a sufficiently firm foundation of knowledge and understanding, which this handbook, among other things, seeks to furnish.

Vogue of miniature cameras. Photography in this fourth decade of the twentieth century has completed a cycle. Beginning as a means of representation it developed into a scientific pursuit and a method of personal expression.

This latter frequently involved much that was not at all photography; but it is now returning as a medium of representation—with a difference.

Modern photographers are enthusiastic in representing to-day's stark facts, swift life and movement of the commonplaces of existence from a fresh angle.

Insatiable demands on the part of experienced photographers who will not tolerate limitations have led inevitably to the manufacture of high-precision cameras; portable, unrestricted in range, and nearly automatic in action.

As a result we now have fully equipped, versatile and accurate to a degree, miniature cameras efficient for work which until their coming was possible only with cumbersome apparatus; and, moreover,

capable of much that no other type of camera could do.

Serious photographers who but a few years ago would have despised pocketable cameras (a quarter-plate instrument was at one period regarded with disdain) are now working exclusively with cameras giving an original negative smaller than a tram ticket.

These workers include experienced practitioners in commercial, press, exploration, pictorial and exhibition photography, and their amazing and technically perfect photographs have fired the general run of "snapshotters," who are now realising the possibilities and qualities of the miniature camera and are adopting it.

Makers have provided us with tiny cameras fitted with lenses of enormous rapidity and exquisite defining power, and roll films of such quality, speed and colour sensitivity as were undreamed of by our predecessors, that the intelligent beginner starts level, as far as the attainment of technical excellence is concerned, with the advanced worker of yester-year.

The beginner differs only in this : he is nebulous in his aspirations ; he lacks the artistic training of the pictorialist ; and he is reluctant to learn the fundamentals of photography.

His productions are differentiated chiefly by their obvious lack of motive and evidence of indecision. But he learns quickly and his education can be made the more rapid by utilising the resources of the miniature camera.

Here, I believe, is the explanation of the increasing popularity of miniature cameras and the

unflagging output of these and their adjuncts by leading and world-famous manufacturers.

Prediction is notoriously unsafe; yet, I am prepared to take the risk and state that as far as general photography is concerned, a few more years will see a pervasive employment of very small cameras in all branches, whether for pleasure, profit, or in the advancement of the amenities of civilisation.

General and appealing advantages are the compactness, portability and self-containedness of these miniature cameras.

Within the space of a few square inches the photographer can carry at all times, in a soft pocket purse or in an ever-ready case slung from the neck, a fully equipped instrument furnished with a single roll of film for twelve, sixteen or thirty-six exposures without reloading and ready for instant use.

This facility of immediate operation is, however, of practical value only when a camera is so optically endowed as to make the registration of the subject effectively on the film, irrespective of prevailing light conditions, regardless of the rapidity with which the subject is moving, and in despite of the amount of depth of field definition the photographer desires.

For this purpose the lens must possess great light-passing power; so it must be of very large aperture; and it must at the same time have great depth of critical definition in order that planes before and behind the principal object focussed sharply, shall be rendered recognisable in reasonably big enlargements.

Good depth of definition and great lens rapidity are, however, incompatible unless the focal length of the lens is short. Hence, these two indispensable qualities can be secured in the miniature camera only, which is equipped as a standard with a lens of five or six centimetres focal length and of nominal rapidity F 3.5, F 2.9, F 2.8 and F 2.

With even this last aperture a satisfactory depth of field can be secured without stopping down, thus allowing sixteen times the light intensity at the film surface as that given by a lens working at F 8.

This advantage of miniature cameras under conditions where the utmost light action must be secured in photographing rapidly moving objects when the illumination is far from brilliant needs no stressing.

In the matter of running costs, once the user has mastered the operating of the camera and is able to handle it with the certainty that comes of practice, the expense is small, the cost of each negative being little more than a penny, assuming the use of the higher-priced films and including the cost of developing and fixing them.

Against this, however, must be balanced the incontestable fact that the ease and expedition with which a large number of exposures can be made in quick succession often leads to indiscriminate snapshotting or uncalled-for repetition of exposures.

Yet, on the other hand, this very ease and the confidence inspired by the knowledge that we have a plenitude of negative material in the camera, encourages us on occasions to make an extensive

number of exposures, and thus secure something valuable that might have been lost to another type of camera.

In addition to this portability, great practical optical power, immediateness of availability and small running expense, we have the inestimable and unique advantage, chiefly as a result of the combination of all those enumerated, of being able to secure perfect records in very difficult situations, under adverse conditions, and in lightings, natural and artificial, which would preclude successful photography with different apparatus.

These, then, are the salient features which indicate that for the making of vivid, forceful, original and profitable modern photographs, the Modern Precision Miniature Camera is the most satisfactory instrument for the purpose.

In the succeeding chapters, after reviewing some typical models of miniature cameras on the market, I hope to show clearly how photographers can so exploit their special properties as to utilise effectively the unique and beautiful qualities of pure photography as a medium of representational expression.

Chapter II

TYPICAL MINIATURE MODELS, ACCESSORIES AND THEIR IMPORTANCE

RELATIVELY great in number, miniature cameras are obtainable at prices ranging from about £1 up to £50.

Although the cheapest models, such as the Baby Box Ikonta, are of the simplest kind, being mainly intended for casual snapshotting, yet they are capable little instruments within their restricted range.

I would suggest to the photographer who is thinking of taking up miniature camera photography seriously, that he may profitably begin with one of these little box models, since it will accustom him to change from a larger size in negatives, to those of miniature proportions.

Moreover, from the enlarged prints he makes or has made for him from the small frames, he will realise the necessity of a perfectly steady camera during exposure, and the great importance of avoiding such physical blemishes as specks of dust, hairs and scratches, on either of the gelatine coatings of the films.

All such unwanted items are much more highly magnified and consequently more difficult to remove

It will be realised that prices given in this and other chapters are only included to help readers to choose apparatus nearest their requirements. Prices may vary in different countries.

or conceal in the enlarged print than they would be in an enlargement of like size made from 9 by 6 cm. negatives.

At the outset it may be well to caution the newcomer to miniature camera photography that he should carry out all the operations necessary, from loading the camera right up to the stage of enlarging the negative, with greater attention to details, to exposure, development, drying and storing his negatives, than is called for when working in larger sizes.

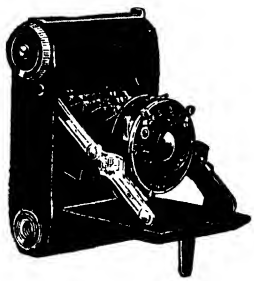
Perfect miniature camera photography demands a high degree of accuracy in working, which is all to the good, leading as it does to careful and thoughtful procedure, with the result that ones ultimate pictures possess a fine quality and reveal what actually good, technical photography can achieve.

Simplified folding or collapsible models cost from about £4 to £12 10s., and their equipment embraces very good anastigmat lenses working at F 4.5. Those at the highest price have F 3.5 lenses and the Compur Shutter. The cheapest models are fitted with a simple automatic three-speed, time and bulb shutter.

All these cameras are focussing ones, and this focal adjustment is made by rotating the front element of the lens, a scale registering the distance focussed, but one little model, the Voigtlander Perkeo, has a scaled disc at the side of the camera for focussing, and this can be set before opening the instrument.

Direct, open frame type view finders are fitted to these cameras and there is also a tripod socket, although this is hardly in danger of becoming threadbare from use.

TYPICAL MODELS



Baby Ikonta. Zeiss Ikon Ltd., 37-41 Mortimer Street, London, W.1.

An all-metal camera, springing open automatically when release button is pressed. Fitted with lenses of 2 in. focus, with focussing mount to three feet.

A good model is the one with Novar F 4.5 lens, in Telma, self-acting shutter at £4 17s. 6d.

Nagel Vollenda 48*: Pupille.* Two cameras supplied by Kodak Ltd., Kingsway, London, W.C.2, are available with an extensive choice of lenses and shutters. Vollenda 48 with 2 in. Zeiss Tessar F 2.8 is a desirable model at £13 10s., being equipped with a Compur Shutter, optical eye-level view finder and precision focussing mount.

Pupille is obtainable with Xenon F 2 lens in Compur Shutter at £21 10s., and is an excellent little camera for action snapshots at night.

Kodak 620 *Duo,* making 16 exposures on 620 film, is an attractive addition. Right up to date in design, at £8 2s. 6d. with Kodak Anastigmat F 4.5 in Compur Shutter, or with F 3.5 Anastigmat at £9 15s. it is really good value, and, of course, perfectly efficient.

Dolly A. Actina Ltd., 29 Red Lion Square, London, W.C.1.

A neat little collapsible camera, giving sixteen exposures on V.P. film. Has self-erecting optical

finder and Certar F 4.5 Anastigmat in Pronto D.A. Shutter. Price £4 12s. 6d.

Korelle. Wallace Heaton Ltd., Bond Street, W.

This fine little camera, in addition to using V.P. film for sixteen exposures, can be used with plates in dark slides, a feature that will commend itself on many occasions. Fitted with the famous Tessar F 3.8 in Compur Shutter it is moderately priced at £9 9s.

Kolibri. Messrs. Zeiss Ikon Ltd. A compact, neat and strong model available with the famous Tessar lens F 3.5, F 2.8 and the Biotar F 2; all mounted in Compur Shutters. An accurately adjusted optical eye-level finder is provided.

Prices range from £13 10s. to £20 5s.

Voigtlander Perkeo. Peeling and Van Neck, 4-6 Holborn Circus, London, E.C.1.

Here is a particularly neat and strong miniature model. Focussing, as stated, can be done by setting a scaled disc on the outside, and at a pressure of the button, the front glides forward to the previously set focal point.

A good optical direct vision finder is fitted, accurately indicating the view angle of the lenses, all of which are 2.3/16 in. focal length.

Price: With F 4.5 Skopar and Embezet Shutter, £7 15s. With F 3.5 Skopar and Compur Shutter, £10 17s. 6d. With F 3.5 Heliar and Compur Shutter, £12 15s.

The model with Heliar F 3.5 I can specially recommend. This lens reveals in the enlargements the peculiar vibrant quality, hardly to be described in words, for which the Heliar is famous.

Krauss-Peggy. A. O. Roth, Catford, London, S.E.6.

This is a remarkable little camera, equipped with valuable refinements which hardly seem possible in so small a space. It takes cine films of the same kind as those used in the Leica and Contax to be mentioned shortly.

There are two models; Model II has a built-in distance meter by which both exact focus and lens setting can be performed simultaneously. The film, normally intended for thirty-six exposures 36 by 24 mm., can be cut with an internal knife, operated from outside the camera, and the exposed length containing any number of frames may be removed for immediate development.

Within the cap of the winding-knob is a light filter, always available and where it cannot be forgotten as filters separately cased sometimes are.

Double exposure of one frame is impossible with the Peggy, nor can any exposure be made until all settings are correctly adjusted.

The special Compur Shutter is released by a button on top of the camera, so placed that the Peggy can be held with great steadiness at eye level, even for long automatic exposures. *A very important feature.* See illustrations Nos. 4 and 5.

Model I, with 2 in. Tessar F 2.8, price £29 15s. Model II, with 2 in. Tessar F 2.8, price £32 5s.

Altogether one of the finest precision miniature models obtainable.

Mentor—Three Four. Mentor Camera Works, Dresden 50, Germany. A. O. Roth, Importer.

A very neat model supplied with a wide range of lenses from F 4.5 to F 2.5. Loading is a rapid and easy matter. All adjustments of this camera are of such precision that enlargements 20 by 16 inches from the negatives show no indication of their modest origin.

Plaubel Makinette. Wauckosin and Co., Frankfurt O.M., Germany.

Among other noteworthy miniature models the new *Plaubel Makinette* is an attractive camera of the collapsible type. Its optical equipment is particularly good—a Plaubel Anticomar anastigmat, F 2.7 in Compur Shutter.

Piccochic 3 by 4. City Sale and Exchange, London.

Remarkable efficiency and completeness at a popular price. Fitted F 2.9 Vidonar lens in self-acting Compur Shutter. Pressure on button springs open the camera and erects the view-finder simultaneously. A carrying handle is attached and the camera, complete with skin pocket pouch, costs only £5 17s. 6d.

This is the speed miniature camera for the modest purse.

Mini-fex Pigmy Camera. R. E. Schneider, 189 The Grove, London, W.6.

Here is the latest development in modern miniature cameras. This pigmy model measures three inches by one and a half inches only, weighs but five ounces, and uses daylight loading spools of thirty-six exposures, each frame being 13 by 18 cm.

The camera can be concealed in the palm of the hand, and operated immediately. An accurate

optical eye-level finder is fitted, and owing to the short focus (1 inch) of the lens, all objects from about a yard are crisply enough defined as to allow half plate enlargements without loss of quality.

Prices: Model M.1 Vidar F 3.5, Vario Shutter, £4 16s. Model M.2 Meyer Kino F 3.5 Compur Shutter, £8 17s. Model M.3 D.F. Plasmat F 2.7 Compur Shutter, £16 15s. Model M.4 Astro Pan-Tachar F 1.8 Compur Shutter, £19 5s.

These prices include carrying case.

Films are thirty-six exposure, daylight loading spools and numbered; the winding key is turned for each fresh exposure just as in the ordinary roll film camera, the number appearing in a red window in the camera back.

Mimosa, Perutz and Gevaert films are supplied for Mini-Fex and are obtainable from Messrs. Wallace Heaton and other leading firms.

For those photographers who like to have their processing done for them, I can recommend Messrs. Associated Studios, 1 Lansdowne Place, London, W.C.1, who have been appointed as the official processing depot for Mini-Fex film developing, and enlarging from the diminutive frames.

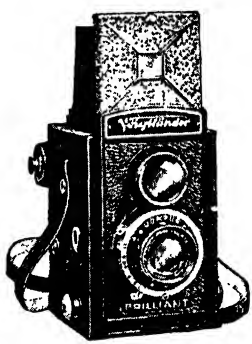
Dallmeyer Dual. J. H. Dallmeyer Ltd., 31 Mortimer Street, London, W.1.

This is a beautifully constructed British precision camera that looks and feels as good as its performance, which is irreproachable.

Fitted with 3 in. "Dalmac" anastigmat in self-acting Compur Shutter, working in a smooth focussing mount. An accurate open-frame view-finder is incorporated.

At the pressure of a button, the Dual opens automatically to any point of focus set beforehand. This camera takes $3\frac{1}{4}$ in. by $2\frac{1}{4}$ in. standard films, giving sixteen exposures thereon, each $2\frac{1}{4}$ in. by $1\frac{5}{8}$ in.

Price: £12 12s. De Luxe hand-made case, 12s. 6d. Light Filters, X2, X3, X4, each, 12s. 6d. Lens Hood, 2s.



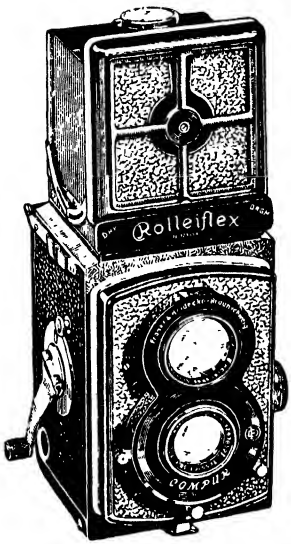
"*Brilliant*" *Miniature Twin Lens Camera.* Peeling and Van Neck Ltd., 4-6 Holborn Circus, London, E.C.1.

This new pocketable little reflex type of camera is remarkable for its low cost and extreme simplicity in use, combined with certainty of excellent results, even in the hands of beginners.

The top lens does not focus but presents at all times a very brilliant, nearly full size, facsimile image of that given by the taking lens. Film used is the standard $3\frac{1}{4}$ in. by $2\frac{1}{4}$ in. spool, but giving twelve square exposures $2\frac{1}{4}$ in. by $2\frac{1}{4}$ in., these being secured by a disc which turns when the film is wound, and shows the numbers, one to twelve, correctly spaced in an aperture at the side. I snapped the picture No. 2, "In the Park," with the cheapest model.

Prices: With 3 in. F 7.7 Anastigmat, £2 15s. 3 in. F 6.3 Voigtar Embezet three-speed Shutter, £4 5s. 3 in. F 4.5 Skopar in Compur, £8 5s. This last is amazing value for the money.

Reflex Cameras



Small (4 by 4 cm.); Rolleiflex. R. F. Hunter, 51 Gray's Inn Road, London, W.C.1.

As the illustration shows, this is a twin-lens camera.

The upper, or viewing lens is a Heidoscop anastigmat F 2.8; the lower a Zeiss Tessar F 2.8.

Both lenses are of 6 cm. focal length and so accurately paired and adjusted that the lower image on the film preserves its absolute identity with the viewing image at any point of focus.

Regular V.P. Film is used, giving twelve exposures, each 4 by 4 cm. These square frames are secured by an automatic shift made by a winding handle, and the number of exposures is recorded in a dial by the same movement of the handle.

Price: With F 2.8 Tessar, £22 10s., or with F 3.5 Tessar, £20.

My own model has the F 2.8 Tessar and I like this lens because of its rapidity and defining power. The small (4 by 4 cm.) Rolleiflex has proved itself in my hands one of the most amazing versatile little cameras I have ever used these last twenty years. This diminutive little reflex will slip easily into a jacket pocket and yet I have found it superior in

every way to the bulky focal-plane shutter reflexes.

From the very beginning I have secured with the Rolleiflex, twelve satisfactory negatives from every roll of film and I attribute this to the astounding precision of the instrument.

It seems incredible that two distinct lenses of six centimetre focal length working at F 2.8 can be so perfectly matched and simultaneously focussed as to give a needle sharp image of objects at any distance within the focal range of the camera.

Yet, from a tiny portion of a film negative, 10 by 7 mm., I have made 18 by 13 cm. enlargements as sharp as contact prints, a magnification of eighteen times linear, or more than 300 times the area!

Had the whole negative been enlarged there would have resulted a picture nearly three feet square and I think this is irrefutable proof that big pictorial exhibition pictures can be made from miniature camera film negatives, when the instrument is properly handled.

An extensive range of accessories is supplied for Rolleiflex cameras. In addition to the two sets of Proxar lenses, each set £2, there are light (2X) and medium (3X) Filters, each 12s. 6d. Panoramic Tripod Head, £1 2s. 6d. Stereo Attachment, £1 7s. 6d. Iris Stop-fitting for the Viewing Lens, £1 2s. 6d.

This last item is for determining visually the amount of depth of focus given by the Tessar when stopped down. The Iris Stop is set to the corresponding aperture of the Tessar lens, then the image on the top viewing screen will show the same depth of focus as the subsequent negative will contain.

Pilot Reflex. Thorsch and Co., 37 Bedford Street, London, W.C.2.

Another miniature reflex of perfect design and robust construction. This is a collapsible model, and when closed is no larger than many of the non-reflex types of miniature cameras. The fully graduated and precise focussing scale is easily manipulated and can be set before pressing the opening button. Sixteen exposures are obtainable on regular V.P. film, the change being made by two pressures on the handle, which at the same time records the number in an aperture below.

Price: With Tessar F 3.5, £18 15s. Tessar F 2.8, £21.

This little camera is a very useful auxiliary to small cine cameras, for the purpose of making "stills" of special incidents during the take.

Both Rolleiflex and Pilot have a powerful magnifier fitted in the hood, allowing critically sharp focus to be made of very near objects with absolute certainty.

Exacta Focal Plane Reflex. Garner and Jones Ltd., Polebrook House, Golden Square, London.

Quite a dainty roll film, one lens reflex, using V.P. film for sixteen exposures. Mirror and shutter setting performed automatically when film is wound. Eye level finder for press work. Lenses fitted in focussing mounts. Prices, including solid leather E.R. case: With F 3.5 Ihagee anastigmat, £14. F 3.5 Tessar, £18, or with F 2.8 Tessar, £21 10s.

I may add here that users of reflex cameras who find difficulty in seeing a needle sharp image on the

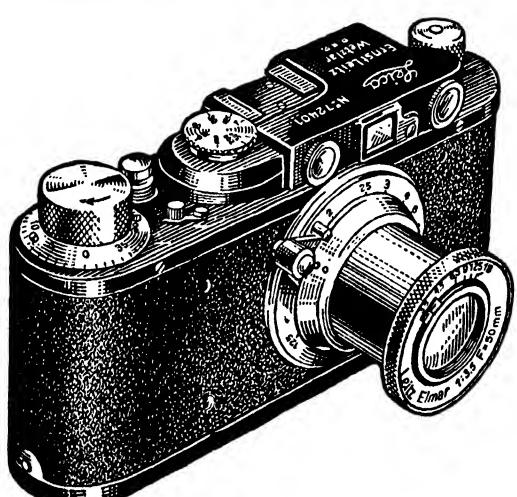
screen, are probably affected, unknowingly, with astigmatism.

It will be advantageous to have the eyes tested and a suitable pair of spectacles fitted, if this is the case. When astigmatism is corrected, no difficulty will be encountered in securing a perfectly sharp screen image.

In general I favour the miniature twin lens reflex camera for serious portraiture and pictorial landscapes, and in all circumstances amid which I can work without haste.

There is much comfort and satisfaction in seeing a facsimile, same size image on the top focussing screen and the ease with which one can carefully compose this image in the picture space is a strong point of these diminutive reflex cameras.

Miniature Universal Cameras



Leica and *Contax* have now become words so familiar in the mouths of men throughout, and even above the earth, that the cameras bearing these names hardly need introducing to the photographer.

Being fitted with a focal-plane shutter, that is, a shutter in the form of a curtain with adjustable slit, working close to the surface of the film, the lenses can be removed with ease, and one different focal length or larger aperture can be substituted at once.

Film for Leica and Contax is of the standard cinematograph kind with perforations, but especially spooled for giving thirty-six exposures to the roll. The actual frame is twice the dimensions of the standard moving film picture, about 1½ by 1 in. (36 by 24 mm.).

Lenses supplied as standard with these models are of 2 in. (5 cm.) focal length and of aperture F 3.5, F 2.8, F 2.5 and F 2.

For much of the photography done by most amateurs, the general 2 in. focal length is sufficient and gives a useful, medium angle of view, which seems to suit most of the subjects from the station-point at which the photographer has to take up his position.

Occasions arise, however, when a wider view angle is necessary to include the whole of the subject, or a longer focus lens is desirable for obtaining fairly large scale photographs of distant or unapproachable objects.

Lenses ranging in focal length from 1¼ in. to 7 in. are obtainable for alternate use with the 2 in. lens, all being mounted in focussing jackets.

Furthermore, every lens, except wide angle, supplied for Leica and Contax, operates with an automatic range finder, permanently fitted on these cameras.

As a consequence of this valuable feature, correct focussing of any object at any distance is assured, whatever the focal length of the lens in use.

Accessories and Their Importance.—Probably the most interesting accessory obtainable is the Reflex attachment supplied by Messrs. Roth, under the name Megoflex. Any Leica, Contax or Peggy camera, becomes a twin lens reflex miniature camera for the time being by simply fitting this accessory. The lens of the Megoflex is attached to the regular taking lens of the camera, and moves with it as the focussing mount is shifted.

It is evident that with the addition of a Megoflex, such cameras as the Leica and Contax become truly universal instruments. Eye level sports or Press type with exactitude of focussing, using any focal length of lens coupled with the automatic range finder, and by simply and rapidly attaching the Megoflex these cameras become precision reflex cameras, ideal for close up portraits and pictorial photography where a full negative size image is so desirable. Megoflex attachments cost £5 15s.

Two light filters, a pale and a medium tint, increasing normally the exposure by two and three times, are indispensable accessories for serious photography. These are supplied by the camera-makers and fit perfectly.

One or two supplementary lenses of the Proxar type will be found invaluable for very near objects,

copying photographs and printed matter and for very large heads.

Proxar lenses are supplied in pairs for use on the Rolleiflex, one for the Tessar and one for the Heidoscop viewing lens. They are perfectly matched, for the user of them has only to see that both the lenses are pushed right home over the camera lens mountings in order to be sure that the critically focussed screen image has its counterpart on the film. Similar pairs are available for the Pilot.

A lens shade will complete the collection of extras which may be considered as really necessary.

Many other additions are to be had for the Leica. There is a stereo attachment, a tripod head for panoramic photographs, and a number of elaborate devices for large scale reproduction, medical work and so on, which will be of more interest to the specialist than the general amateur.

Perhaps the most useful little extra for those who acquire several lenses of different foci is the Universal View-finder, which can be adjusted to correspond and which, furthermore, has a device for compensating the change of view-angle which occurs when near objects are being photographed. This item is priced at £3 18s. 6d.

Price of Model II Leica with F 3.5 Elmar, £22, with F 2.5 Hektor, £25 8s.; Price of Contax fitted Tessar F 3.5 £24 10s., fitted Tessar F 2.8 £27, fitted Sonnar F 2 £32 10s., fitted Sonnar F 1.5 £48 10s.

Contax Model II with slow speed addition to the shutter, $\frac{1}{2}$, $\frac{1}{5}$ and $\frac{1}{10}$ second, costs £3 extra to the prices given above.

There is such an extensive range of accessories for these superb cameras that a list would require too much space. Full details will be supplied on application to the makers at the addresses given. Some notable Leica accessories deserve mention here, since they are insufficiently known to many professional photographers who could make use of them to advantage.

I am referring to the Leitz Binocular Magnifiers, which, though not classed as an accessory by the makers, may be considered as such since they are so valuable in retouching miniature portrait negatives.

Occasions arise when retouching is called for to remove disfiguring facial blemishes or for straightening a slightly squinting eye.

By placing the film on the glass stage of the Binocular Magnifier, one can see and retouch in comfort, a greatly magnified image of the negative; a universally adjustable mirror below throws the light through the negative, while a binocular eyepiece enables the photographer to prolong the work without eyestrain.

Eyepieces giving a magnification of $3\frac{1}{2}$ times I find quite powerful enough, but others up to 30 times are obtainable and interchangeable.

Leica Model III. Remarkable as is the Leica II, this new model is a notable advance both in its capacity and precision. Leica III, in addition to providing the full range of automatic snapshot speeds from $\frac{1}{20}$ second to $\frac{1}{500}$ second, is equipped with a slow automatic speed setting giving those invaluable speeds of 1, $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{8}$ second by merely

setting a pointer actuated by a small knob at the side of the lens mounting.

The automatic range finder of Leica III is equipped with a little telescope giving a magnification of $1\frac{1}{2}$ times, increasing the field of vision and enabling those with long or short sight to adjust the telescope to suit their impaired vision by means of a focussing mount fitted thereto.

Moreover, this eyepiece can be displaced upwards and downwards so that the correct view angle is observed when photographing close up or distant objects. Price of this model, £25 with F 3.5 Elmar.

All cameras reviewed, excepting Leica, Peggy, Contax and Mini-Fex, take standard V.P. or $3\frac{1}{4}$ in. by $2\frac{1}{4}$ in. films of all makes and speeds.

Daylight loading spools for Leica, Contax and Peggy, thirty-six exposures, all grades excepting Panchromatic, 3s. 8d.; Perutz in twelve exposure spools, 1s. 6d.; Agfa and Kodak Super Pan, thirty-six exposures, 4s.

Mini-Fex films are supplied in spools of thirty-six exposures, daylight loading, in the grades following: Gevaert Orthochromatic, 1s. 6d.; Gevaert Express, 1s. 10d.; Mimosa Fine Grain, 1s. 6d.; Perutz Fine Grain, 1s. 10d. All spooled in double-eighteen exposures.

Chapter III

(Part 1)

CHEMICAL, OPTICAL AND RELEVANT MATTERS WITH SPECIAL APPLICATION TO MINIATURE PHOTOGRAPHY.

PHOTOGRAPHY has been aptly defined as the application of Chemistry and Physics to reproductive and artistic purposes.

Although the production of good technical and pictorial photographs can be effected with the barest possible knowledge of Chemistry and Physics, yet a little acquaintance with these in so far as they are concerned with photography, not only adds interests to the latter, it has the further value of enabling the photographer to work with rational progression.

Moreover, many little problems, perplexities and failures that arise can be determined, cleared up and rectified, but without this foundation they may continue indefinitely a source of confusion and so prevent the photographer from obtaining the best results, of which he would otherwise be capable.

I mentioned in the opening chapter that there seems to be a prevalent reluctance with beginners to acquire the fundamentals of photography. If this is due to the fear of mathematical or chemical formulæ or a dry disquisition on Optics, the reader may reassure himself.

No profound study is called for, nor is the small amount of knowledge desirable devoid of interest in itself as, I hope, the pages following will testify.

There being also a few relevant and important matters with which some acquaintance is desirable for the intelligent pursuit of modern miniature photography, it will be convenient to collect them here in a few preliminary paragraphs instead of scattering them throughout the succeeding chapters.

Roll films such as we use in miniature and other cameras are bands of celluloid coated with a mixture of gelatine and light sensitive salts of silver. In the gelatine the salts of silver, in a very finely divided state, are held in suspension.

Gelatine is a colloid, that is, a glüe-like substance as distinguished from crystalline substances such as sugar and salt. Colloids allow the diffusion through them of solutions of carbonate of soda and sodium sulphite, these chemicals forming the greater bulk of most developing compounds used in finishing the exposed films.

Mixed gelatine and sensitive salts are, of course, applied to the transparent celluloid band in a fluid state, and this mixture in the process of drying and hardening forms into a jelly, which finally sets hard, comprising a network of cells, in structure like a honeycomb, through which the developing solution can ultimately diffuse.

When the exposed film is placed in a tank containing a suitable developing solution, this diffuses fairly rapidly into the passages of the network itself but takes longer to penetrate the cell walls and within these cell walls of our film are encased the minute

sensitive grains of silver. These grains are the factors so significant in practical miniature photography.

Under a microscope it can be observed that during the process of development, the silver grains give off fine filaments which penetrate the enclosing cell walls and so allow easier access to them of the developing solution.

This explains why an exposed film when developed by inspection seems to show no sign of change for a considerable time, but rapidly gains strength and contrast at later stages of development.

When the developer has obtained access to the silver grains a chemical reaction takes place and the silver bromide grains are converted into metallic silver, this representing the different tones of the subjects on our strip of film negatives.

Miniature camera negatives are a stage on the journey to perfect, enlarged photographs, perhaps of sixty times the area of the original negative. This relatively enormous stretching must inevitably result in some, however little, loss of quality, softening of fine definition, coarsening of any granularity, and magnification of any distortion.

The metallic silver grains themselves can be coarsened disastrously by prolonging the development of under-exposed films in the hope of bringing out detail, non-existent because there was insufficient light action during exposure to impress it on the film.

They will also become coarser readily, if the processed film is dried by heat. The gelatine itself will acquire stresses and strains, distorting the silver image therein, if the film is transferred to, and from, solutions of different temperatures.

Differences of solution temperature enlarge or thicken the network of the gelatine, causing what is known as reticulation, a blemish which unfits miniature negatives for enlarging.

Developing solutions are reducing agents. This means that they combine with oxygen in the formation of metallic silver (the negative image on the film) from the exposed silver bromide. This process of combination greatly weakens the activity of the developer, hence a fresh solution must be used for each roll of film.

It is important to know that in general a given developer of some particular strength acts less rapidly upon a very high speed film than upon a slower one. It usually requires a longer or shorter time for complete development with films of different makes, and when changing from one to another the user should not forget to ascertain the correct developing-time from a book such as Wellcome's Photographic Calculator.

Increase or decrease of temperature accelerates or retards development, so, too, the temperature of the solution must be taken.

Among the imperiously indispensable adjuncts to miniature photography a clock and a photographic thermometer hold front places.

No development of a photographic image can take place until the film has received exposure to light during the taking of a photograph.

From all portions of the subject before the camera, light is reflected in every possible direction in the form of rays which travel in straight lines.

Some rays from every part of the subject reach

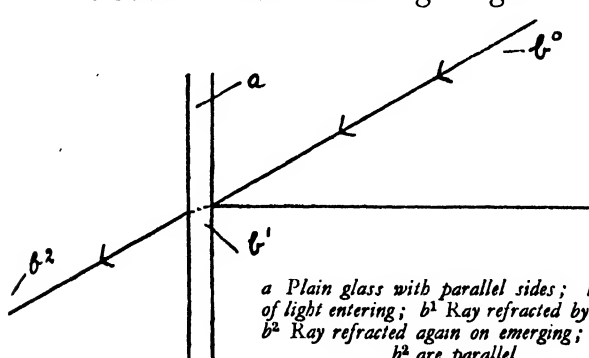
the camera lens after traversing the intervening atmosphere.

Anything through which rays of heat and light can travel is known as a medium. Air is a medium; glass is a medium. Different mediums, and similar mediums under different conditions, are of different densities. Glass is a denser medium than air.

Rays travel with a certain velocity through some particular medium but are slowed down or speeded up if they pass into a denser or rarer medium. A ball-bearing, for example, will travel more slowly down a jar of glycerine than down a jar of water.

When a ray of light that has passed through a medium such as air, reaches the surface of a denser medium such as the glass of our camera lens, it is bent, or refracted, from its course. If the second medium is a piece of plain glass with parallel faces the ray is but slightly refracted, and after passing through the glass it is again refracted by the same amount but in the opposite direction.

Hence, it pursues its course in a line exactly parallel to the line of travel before reaching the glass.



a Plain glass with parallel sides; b° Ray of light entering; b¹ Ray refracted by glass; b² Ray refracted again on emerging; b° and b² are parallel.

fig 1

Rays of light passing from a medium (air) into a denser medium (glass) are bent, or refracted towards a perpendicular to the surface of the denser medium (see Fig. 1), and when they emerge from a medium into a rarer medium they are refracted away from a perpendicular to the surface of the denser medium (again see Fig. 1).

Lenses fitted to cameras have curved, not flat, surfaces, and in the short focal lengths used on miniature cameras these curves are comparatively deep ones. Photographic lenses are not, of course, made from one solid piece of glass but the combined optical effect of the three, four or six different elements is the same as in a lens composed of one glass only, having the same focal length.

It will be seen from Fig. 2 that when rays of light coming from our subject strike the powerfully convex surface of the lens, pass through after undergoing refraction and emerge (inside the camera), they have been strongly condensed.

Thus the image depicted on the film surface when the shutter is operated, is a minute reproduction of the objects before the camera.

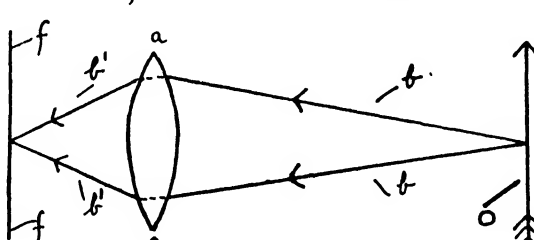


fig 2 *a a Lens; b b, b^1 b^1 Image rays; f f Film; o Object.*

Now since the finer details in the subject itself are already very small it is clear that the impression of them on the developed film will be exceedingly minute, almost invisible to the unaided eye, and yet they must be of such exquisite sharpness as to enlarge greatly without serious loss of structure or identity.

I fancy the preceding paragraph will bring home to the miniature camera user not only the amazing precision of these instruments, but also the necessity for every precaution to avoid the destruction of this exquisite definition, of which the cameras and lenses are easily capable when properly handled.

Absolute steadiness of the camera during exposure, sufficient but not excessive exposure, moderated development time to avoid enlarging the silver grains, spontaneous drying of the film to escape granularity and reticulation. Such are the important manipulative details calling for unremitting attention and well repaying such watchfulness.

There yet remains something to be said about the silver grains. The importance of realising their full significance is a valid excuse for prolonging the discussion.

Knowing that these minute grains of silver bromide are irregular in contour and embedded, not continuously, but at intervals, in the supporting gelatine, it will be readily understood that when the image bearing rays of light strike them, some of these rays will rebound, since nothing in nature is totally absorbent of light.

The reflected portion of the light, though relatively small, strikes against other grains and

it is this further light action on the film which causes halation or irradiation, familiar as a faint halo around bright portions of the print, chiefly where these are in juxtaposition to dark parts. Solid objects against the sky, objects outdoors seen through a doorway for example. See illustration No. 21, " Gossip."

In the improved films of to-day this halation and irradiation has been rendered practically innocuous under most conditions of work, by the provision of a second and slower emulsion beneath the rapid exterior one ; by a non-halative layer between the lower emulsion and the celluloid ; or by a coloured backing of the film itself.

Irradiation or halation, however, can yet occur, if the exposure is excessive. It is obvious that the longer the exposure, the stronger the light action, not only in strengthening the subsequent deposit of metallic, image forming silver, but additionally in intensifying the halation producing light reflected from the tiny particles of silver.

Messrs. Kodak Ltd. have kindly supplied me with a photograph of silver emulsion grains. See illustration No. 6. This, a photomicrograph, showing the actual grains magnified about 10,000 times, illustrates very well the irregular distribution and varied shapes of these grains, as well as the great variation in size.

In the cine film supplied for use with their new cine " Kodak " Eight, the Kodak Company have now surpassed anything previously achieved in reducing the grain structure to an inconceivable fineness, so fine indeed, that each frame, although

but one quarter the area of the sub-standard 16 mm. film, yet allows of a projection three or four feet wide without any apparent graininess.

Although this book is confined to "still" miniature photography, readers may be interested in the photograph (No. 7) also reproduced by permission of Kodak Ltd., showing a length of the Cine "Kodak" Eight positive film partly split down the centre.

There is one application of a yellow light filter which is of paramount importance to the miniature camera user.

I have shown why excessive exposure destroys the quality of negatives and I advise generally keeping the exposure at the minimum for outdoor work.

But the real cause of over-exposure, as most photographers are aware, is the inordinate sensitiveness of the film emulsion to the ultra violet end of the spectrum. If, therefore, a pale light filter (No. 1 or K 1) is always used on the lens, outdoors, this will cut out the unwanted ultra-violet rays and have great effect in preventing halation and irradiation.

Quite apart from colour correction, it is my invariable practice, and I would strongly advise all miniature camera users to do the same, never to make an exposure in outdoor daylight without having a light filter on the lens. The gain in every way is gratifying. More harmonious negatives, less risk of over-exposure, avoidance of halation and irradiation and better sky renderings.

High speed lenses are the principal attributes of miniature cameras—e.g. lenses of F 2.8 aperture are, as we know, nominally eight times as rapid as a lens whose largest aperture is F 8.

In general, experience has justified this belief, and by in general I mean photography with all sorts and sizes of cameras and lenses employed for the usual kinds of photography in ordinary professional and amateur work.

Short focus, high speed lenses present an anomaly. In common with other experienced users of miniature cameras I have found that with such lenses the light action on the film is in some circumstances much in excess of what it should be in theory.

Since a close approximation to the proper exposure is very important in miniature photography, this matter needs discussion. Different explanations have been offered of this peculiarity. Some maintain that the glasses of the lenses being much thinner than those of lenses of longer focal length, they absorb less light.

This may explain a slight increase in rapidity generally but not the greatly enhanced light transmission which seems most effective out of doors, in daylight and with fairly open subjects. Furthermore, large aperture lenses, say F 4, give more exposure to the film at 1/64 second, than they give with an exposure of $\frac{1}{8}$ second when stopped down to F 11.

My own theory is that one cause is the actual distance the rays of light have to travel inside the camera determines the apparent increased speed of the lens.

If we set up a miniature camera with its five-centimetre focal length lens side by side with a 9 by 12 cm. camera fitted with a fifteen-centimetre focus lens of identical formula and working at the same aperture, say F 4, in the latter case the image bearing rays have to travel three times the distance from lens to film they have to do in the former.

Now inside the cameras is air, holding impurities and invisible floating particles like the air outside. These atmospheric contents absorb and scatter rays of light traversing them, hence I conclude that rays coming to the film a distance of five centimetres suffer about one third only of the absorption and scatter than do those travelling three times the distance in the 9 by 12 cm. camera with its 15 cm. focus lens.

In explanation of the extra rapidity of large aperture lenses, beyond that of the nominal stop value, I believe that the impact of a wide beam of light of given strength has a greater effect than, say, sixteen impacts each of one sixteenth the value.

We may compare the forcing of a bolted door. A thousand hand pushes against the bolt will not have any appreciable effect in opening the door. But if a strong man collects his strength and makes one powerful assault equal in amount to the thousand ineffectual pressures, the door bursts open.

In this rather fanciful analogy the former condition represents an exposure of one-tenth second at F 11, while the latter corresponds to 150th part of a second at F 2.8.

The relatively great mass of light coming from an

aperture of F 2.8 strikes deeper and makes a darker bruise, and I take this as some explanation of the occasionally amazing results obtained with big aperture miniature camera lenses under conditions which theoretically should eventualise as gross under exposures.

To test the validity of the theory I made a laboratory experiment. An electric lamp was fixed on the bench, then a miniature camera with a five centimetre Zeiss Tessar F 3.5 and a 9 by 12 cm. camera bearing a Zeiss Tessar F 3.5 of fifteen cm. focal length were set up and sharply focussed on the light.

For the test, the backs of the cameras being removed, a piece of finely ground glass cut from the same sheet was fixed in the film plane, both ground glass screens having been masked down to one square inch at the centres.

Each lens was then carefully set to F 4, and with a photometer I made six readings of each, and taking the averages found that the light intensity at the surface of the ground glass was as 1.6 is to 1, the higher number being that of the 5 cm. Tessar.

I do not put forward this theorising or experiment as truly scientific; I can but hope that it is in the nature of a preliminary, scientifically directed guess.

While miniature camera lenses possess great depth of definition, this must not be relied upon as a substitute for inaccurate or careless setting of the focussing scale. If we set the scale of a 9 by 12 cm. camera having a lens of 15 cm. focal length, at the

infinity mark, and then extend the front until an object at two metres distant is sharply defined, we shall see that the pointer on the scale has travelled about 25 mm. (one inch) forward.

When a similar operation is performed with a miniature camera and a 5 cm. lens, it will be observed that the lens has moved forward a much shorter distance in comparison.

Moving the front of the larger camera from the infinity mark to a distance actually the same amount as that in setting a miniature from infinity to two metres will throw the distance slightly out of focus only, and the general depth of field will yet remain defined, with fair sharpness.

Not so with the miniature camera, everything beyond three metres will be unsharp, not appreciably in the negative but quite evidently in a 9 by 12 cm. enlargement therefrom.

Much disappointment ensues because of inattention to this matter, particularly when close-up subjects are photographed, if one trusts to the depth of focus of a 5 cm. lens to conceal inaccuracies in setting the focussing scale.

It will usually be found preferable in close-up work to set the scale a little nearer, rather than beyond the actual distance of the subject, if the main important feature is the nearest object, and especially if it has some solidity, such as a large head.

Chapter III

(Part 2)

ALL new lenses have beautifully "black" polished surfaces which the owner, and particularly the miniature camera owner, should endeavour to preserve.

Properly cared for and handled, nothing more should be needed in the way of cleaning the lens than the removal from the exposed surfaces of dust, using a soft sable brush which should be fixed at the handle end in a cork, which in its turn should be pushed into a clean test tube and kept there until wanted.

On no account should the lens cells of a miniature camera be screwed out of the mounting or shutter. The adjustment is so exact of necessity that such procedure is very likely to disturb this precision. The screw threads are easily crossed; the exact separation easily disturbed; with the result that the needle sharp defining property of the little anastigmat may be seriously affected.

Since it is a policy of wisdom to keep the camera and lens clean rather than to remove unwanted matter, always store the apparatus in its proper case, and if it is carried in the pocket, let this be clean and protect the camera with a soft purse as an extra and advisable precaution.

Light filters and Proxar lens should also be kept in cases, for the same reason.

Sometimes a tripod is necessary, even with a miniature camera, a fast lens, and ultra rapid films.

I remember on one occasion I had to make a week-end stay away from town on business. I slipped one of my little cameras in my pocket in case a few interesting " snapshots " should present themselves.

One subject I found which I wanted very much to record. It was in a very dark situation and necessitated, owing to the subject itself and the conditions, an exposure of some seconds. And there was nothing available upon which to support the camera.

I hunted up three persons who I knew were amateur photographers. None of them had a tripod. At last I came across a man who had never handled a camera in his life, but he thought there was something of the sort of thing I wanted away up in the lumber room.

There was, a huge wooden stand belonging to a vanished field camera. Unfortunately it was an Irish tripod, one leg was missing!

Light metal tripods closing to less than nine inches in length are obtainable and one such is, on occasions, a very friendly little accessory to have in the pocket.

When using a tripod for a time or brief time exposure, be sure to have a fairly long and flexible cable release. Short, stiff ones are supplied with the cameras, and while suitable for hand exposures, they vibrate the camera if this is on a tripod of delicate construction.

Developing Miniature Films.—These details are given as a standard procedure which I have adopted as the most satisfactory in my own finishing.

Other methods there are, no doubt, which will lead to successful negatives, but for the inexperienced I strongly advocate the routine I am giving here.

Nothing will be gained by departing from it, whereas following it will ensure excellent strips of negatives.

For the V.P. and 9 by 6 cm. Film the Kodak $2\frac{1}{4}$ inch developing tank is needed, a Kodak thermo stirring rod, any clock, a large enamelled wash bowl, a pail for waste, and a large pitcher for water.

We need, also, a pair of clips and some cotton wool.

If the perforated Leica, Contax or Peggy film is to be developed, the 16 oz. Leica Correx Tank or Contax Tank takes the place of the Kodak Tank.

Developing chemicals required are Kodak $2\frac{1}{4}$ in. tank developing powders or Tabloid Rytol or Azol and Tabloid Desensitizer and Acid Fixing Salts.

Some hours before development of the film, have the large pitcher with pure water standing, with covered top, in the room in which development is to be done.

Acid Fixing Solution may be prepared in suitable strength any time previously and a two-pint bottle kept ready for use. This bottle should be placed also in the room.

The idea is, of course (see Chapter III, Part 1) to have all solutions, rinsing and washing waters of the same temperature.

Just before winding the film in the lightproof celluloid band, mix up the developer, Kodak powders for the Kodak tank, Rytol or Azol for the Correx or similar Zeiss Ikon tank, according to the directions.

Thoroughly solutionise the powders or tabloids with the Thermo Stirring Rod, noting the temperature.

Before placing the film in the developing tank immerse it for three or four minutes in a desensitizing solution made up by dissolving six Tabloids of Desensitizer in sixteen ounces of water.

This preliminary desensitizing is advocated for the reasons following.

During the transference of the developed film from the tank to the fixing solution one must go steadily and carefully in detaching the film from the celluloid band in order to avoid damage, and although the bulk of developing solution has already been washed out of the film, some still clings in the gelatine.

This residual developer, with the ultra speedy and panchromatic films, may develop fog during the time the yet unfixed film is exposed to actinic light.

By preliminary desensitizing, this danger is avoided and, moreover, it lessens the chance of markings which sometimes show on tanked films. The desensitizing solution may be used repeatedly if stored in an opaque bottle.

Directions for using the tanks and adjusting development time to prevailing temperature need not be repeated here since the manuals accompany-

ing these tanks contain full and explicit information. One point, however, do not over-develop. If the tank manual says twenty minutes at 65 degrees F., eighteen minutes should not be exceeded, unless contrasty prints are wanted.

Over development will amplify any irradiation or halation and it will make the tiny negatives too contrasty for harmonious enlargements.

Keeping in mind that the modern ultra rapid films are double coated, fixation should be thorough.

Washing should be done in five or six changes of water from the pitcher, using the enamelled bowl. Six periods of about four minutes each are sufficient to rid the film of fixing solution, *provided the fixation has been thorough.*

If a greenish stain persists in panchromatic films after fixation, bathe for five minutes in a solution of carbonate of soda 1 ounce, water 10 ounces.

When washed, attach a clip to each end of the film and hang in a dust free spot where a gentle current of air can reach both surfaces.

Before leaving the strip to dry, the adhering drops of moisture should be removed. For this purpose take a large handful of non-medicated cotton wool, dip it in clean water, squeeze it nearly dry, pull it apart again and wipe the suspended film from top to bottom with one firm stroke. Repeat for the other side and then leave the film alone for some hours when it should be found straight and dry and with unblemished surfaces.

I have found it preferable not to cut the frames apart, but to keep them intact and roll them up for storing. The Zeiss Ikon storing cabinet provides a

very suitable means and holds more than forty rolls of miniature film negatives.

Miniature camera users who have absorbed the suggestions and advice of this and the foregoing chapter, should find, on examining the negatives through a strong magnifying lens, crisp outlines, needle sharp definition, details in the parts representing the dark portions of the subject and no fine scratches in the gelatine surface of the film.

There may be one or two pinholes, absolute perfection is unattainable. These pinholes due, of course, to specks of dust which will have settled on the film while in the camera, may be filled up with a very fine sable brush, the tip of which is very slightly moistened with a little artists' quality warm black or prussian blue pigment, well diluted.

Trail the brush along a bit of paper until the merest trace of colour is left and then just touch the pinhole with the extreme point of the brush.

A simple holder for the negatives can be made by cutting apertures just a little smaller than the dimensions of a "frame," in two pieces of cardboard of about five by four inches. The length of film is then put between them and held in place by two elastic bands clasping them all together. This sandwich of cardboard frames and strip of film negatives is in turn held on a piece of thin three-ply wood about ten by eight inches, with an opening about four by three inches cut out of the centre.

Two metal finger springs screwed on the board will hold the sandwich with its film strip which can easily be raised or lowered between the cards, in order to bring each frame into position.

The board may be held at any convenient angle by two wooden arms, and light reflected through the negatives from a sheet of white paper. This is better than a mirror, being more diffusive and less trying to the eyes. A pair of binocular magnifying spectacles such as Watson's "Speera" Spectacles is of great assistance in spotting, and such spectacles are advisable for this operation where the eyes no longer retain the keen power of youth.

Little more in the way of negative modification is practicable with miniature negatives, but one might consider, where some artistic manipulation is premeditated, that an enlarged positive may be made, worked up according to the photographer's idea, and from the positive a fresh negative, either by contract or enlargement, is a further step. This final negative also being modified if so desired.

These latter suggestions will be of more interest to the pictorialist, and even here, the facilities for control in enlarging, to say nothing of Oleobrom, make the necessity for intermediary positives and negatives of little importance for most productions.

Modern High-Speed Films and some of their special characteristics.

VERICHROME.—Highly sensitive to greens and yellows, almost approaching panchromatic in this respect. Excellent for skies and clouds and portraits of dark persons. Ideal for photographs including naked lights.

SELOCHROME.—A fine film for general miniature work. For portraits of very fair people, when used with a pale light filter, gives excellent colour values.

AGFA ISOCHROM.—One of the best films for good contrast on dull days and in winter. Develops quickly.

ZEISS IKON, MIMOSA AND PERUTZ FINE GRAIN.—Specially advantageous for copying and where large commercial and technical prints are wanted.

GEVAERT EXPRESS.—An exceedingly rapid film particularly effective in rapid action sports work.

PERUTZ PERSENSO, AGFA AND KODAK SUPER PAN are especially indicated for outdoor night snapshots and snapshots of stage incidents.

ZEISS IKON U.R. PERNOX FILM has the amazing speed of 2,500 H. and D. to daylight and is fully sensitive to yellows and greens. For rapid action work near or at sunset it will secure fully timed exposures. For ordinary outdoor snaps during the summer months $\frac{1}{25}$ second can be given with the lens at F 22 or at F 8 the same exposure with an eight times light filter on the lens. Using this film with a lens of F 2.8 snapshots indoors can be made in ordinary well-lighted rooms.

LEICA PERUTZ FILMS in all grades are now obtainable in a new form of packing which presents several noteworthy improvements. This packing is a precision-made metal case, pressure, light and dust proof, and it will appeal particularly to travellers in sandy districts and all photographers who frequent dusty race courses, while for seaside photography it is excellent.

I am especially pleased with this casing because it positively prevents those physical blemishes against which I advised meticulous care earlier in the book.

The case need not be discarded after the film is used, since it forms an excellent storage container for the finished roll of negatives. Price is the same as for other Leica films. Obtainable at all dealers. The sole agent is Mr. R. O. Seifert, 8 Beulah Hill, London, S.E.19, who also supplies Mini-Fex films, Perutz developers and specially fine grain films for other miniature cameras referred to in this book.

Interchangeable lenses available for Leica and Contax with their special advantages and application.

LEICA STANDARD ELMAR F 3.5 2 in. FOCAL LENGTH.—For general, all round photography, sufficiently rapid, exquisite definition, allows of enlargements to any practical dimensions.

Wide angle Elmar F 3.5 3.5 cm. focal length. Useful for interiors, confined situations, architectural subjects in narrow streets.

HEKTOR F 1.9 73 mm. FOCAL LENGTH.—Valuable for very large heads (see illustration No. 29), stage and night snapshots. The image given by this lens possesses a fine "soft-sharp" quality when taken with full aperture, particularly effective in portrait work; slight stopping down increases the definition to that given by the Elmar.

HEKTOR F 6.3 4 in. FOCAL LENGTH (not telephoto type).—A useful lens for Alpine and other mountainous regions. Light in weight and gives a more imposing rendering of distant mountains (four times the area) than standard 2 in. lens.

ELMAR F 4.5 13.5 cm. FOCAL LENGTH (not telephoto type).—A fine long focus supplement lens for distance sports pictures and groups. Definition at full aperture very good.

SUMMAR ULTRA RAPID F 2 5 cm. FOCAL LENGTH.—This lens gives most remarkable definition at its full aperture, combining enormous speed with absolutely needle sharp definition over the whole negative area. Invaluable where very big enlargements must be made from negatives taken under difficult lighting conditions and requiring rapid exposures.

HEKTOR F 4.5 13.5 cm. FOCAL LENGTH.—This lens, similar in application to the 13.5 cm. Elmar, has a greater resolving power than the latter. It has been designed for infra-red photography of distant scenes and for archæological and architectural work demanding the keenest definition and detail in the small negatives. In conjunction with Perutz fine grain film the negatives yielded seem to have no limit in enlarging, the magnification can be taken so high as to reveal the grain, even in the fine grain films, without losing the image structure.

Messrs. Leitz are to be congratulated on their achievements in mechanical and optical perfection.

All the foregoing are made by the Leica manufacturers. Messrs. Dallmeyer Ltd. supply for the Leica their super-six lens F 1.9 2 in. focal length of perfect correction and defining power; this lens is excellent for night snapshots and press work under bad lighting conditions. And a 4 in. Dallon Telelens F 5.6 giving superb definition at full aperture is also made by the same firm.

Ross Ltd. list a 4 in. Teleros F 5.5 for the Leica.

CONTAX STANDARD TESSARS, F 3.5 and F 2.8.—For general photography. It is unnecessary to remark on the perfect correction and needle-sharp

defining quality of the famous Tessars. Sonnars F 2 and F 1.5 2 in. focal length are not inferior to the Tessar in correction and definition. Their high speeds are valuable for night photography and when stopped down they are as good as the Tessars for general work.

TRIOTAR F 4 3¼ in. FOCAL LENGTH.—A useful medium long focus lens for big heads and general indoor and studio portraiture. Rapid enough for high speed work at 1/1000 second when one cannot approach closely to the performers.

SONNAR F 4 5⅜ in. FOCAL LENGTH.—A rapid long focus lens, particularly useful for high speed sports work in securing a large image on the film from the spectators' enclosure. As a supplementary lens for general narrow angle pictures like street groups, while keeping well distant from ones subjects, this lens is highly desirable as supporting the regular 2 in. Tessar. Since it gives an image equivalent in view angle to a 15 in. focal length telelens on a ¼ plate reflex, its value will be self-evident.

The Contax has a sliding mask which can be brought in front of the finder lens, and which then shows a facsimile of the reduced view falling on the film when the 5⅜ Sonnar is in use.

LONG-DISTANCE F 6.3 7 in. FOCUS LENS.—This lens, equivalent in use to a 20 in. telelens on a ¼ plate will be found useful for photographing distant villages from mountain heights and conversely for big-scale snapshots of mountain climbers taken from the ground.

When using lenses of 5 in. or longer focal length,

it is always best, whenever possible, to support the camera on a tripod; this obviates vibration and ensures the correct placing of the subject on the film. A slight movement of the camera when the normal lens is employed may not cut off any essential part of the subject. When a long focus lens is in use, the image moves much more rapidly as the camera is moved, and the loss of some important feature may easily occur, unnoticed.

If the camera must be held in the hands the fingers should firmly support the lens mounting, a fairly rapid speed be dialed, and a careful observance of the finder image should be maintained until the exposure has been made.

WIDE ANGLE TESSAR 1-$\frac{1}{16}$ in. FOCAL LENGTH.—Valuable for interiors and confined situations. The remarkably exquisite defining power of the Tessar has been recognised and appreciated, as well as its covering power over a very wide angle, for many years.

Contax negatives made with this lens, using Zeiss Ikon special fine grain film, will stand an almost incredible degree of enlargement.

The Contax with the W.A. Tessar will slip into the pocket, and 15 by 12 enlargements from negatives made with it are in no way inferior to direct prints made from negatives taken with a 15 by 12 stand camera and a 12 in. W.A. Anastigmat.

Architectural enthusiasts and commercial photographers can produce, with the miniature equipment just mentioned, results that can stand up to the best work produced in bygone days, with heavy and ponderous outfits.

Chapter IV

GENERAL RECORD, COMPETITION AND VACANCE PHOTOGRAPHY

GENERAL SNAPSHOT WORK

UNDER the term general record photography I am thinking of the various subjects that appeal to most amateurs who are not primarily concerned with the purely pictorial aspect.

Such subjects embrace records and mementoes of interesting things and places seen during a ramble, street incidents, buildings, market episodes, portrait snapshots, groups, pastorals and kindred subjects.

These mostly call for a snapshot exposure of 1/25 or 1/50 second, and being ordinarily taken under favourable lighting conditions, a moderate stop, F 8, in conjunction with an ultra rapid film, will secure an accurately timed and properly graded negative suitable for enlargement.

But what is engaging the interest of the present day amateur is the incorporation of the new spirit in his all-round photography.

Although many novel and sometimes startling subjects are frequently selected, a vast number of those which have always appealed to us still continue to be photographed, but from an entirely fresh angle.

Miniature camera owners may well, therefore, be ever on the alert for the unusual, the quaint or striking viewpoint, as well as the distinctive and uncommon subject.

For example, I may suggest that instead of snapping a motor bus from the sidewalk, it would be in keeping with the new spirit to photograph the passengers boarding or alighting, pointing the camera down from the upper deck or from the top of the stairs.

Leaving the lens open at F 2, F 2.5, F 2.7 or F 2.8, it is practicable to photograph inside the vehicle almost, if not quite, unnoticed, when you have a miniature camera. One tenth with the Compur shutter, released when the vehicle stops at a station, should secure, on a bright day, mightily interesting character studies.

There is enormous scope here and in similar situations, for the employment of the short focus, high-speed lenses of miniature cameras, in obtaining unusual pictures.

Indeed, it seems relevant to remark that too little photography is being done in registering people, their habits and occupations. Apart from the human interest, if this sort of photography is undertaken with sufficient seriousness, there will be some priceless records for our descendants, future sociologists and historians.

It is the almost unlimited equipment of the miniature camera that gives us this facility and it is well worth while to take advantage of it.

Many of these subjects will be close-up ones, the opportunity presenting itself suddenly and unex-

pectedly. On one occasion while resting on a seat in one of the public parks such an unlooked-for incident presented itself to me.

A mother with a lovely baby sat down about a yard away, and as she nursed her youngster I saw a delightful picture and almost with the thought my ever ready miniature camera secured the negative for a fine exhibition print, quite unnoticed by the lady or any other of the visitors.

Again, the bizarre, and frequently beautiful shadow patterns in the city streets offer, if used as the motif, many opportunities for new angle photography. Most unlikely localities and situations constantly surprise one who goes about with his eyes open. See illustration No. 22.

Things seen in shop doorways or windows; a peep into a restaurant; vivid little conjunctions and poses at a taxi-cab rank. All these suggest themselves as promising subjects for new angle treatment in photography.

And there is night photography! Here, the practised miniature camera user has a multitude of fascinating subjects wherein the all embracing little camera makes it easy to secure interesting new angle pictures for exhibition, pleasure and profit.

Considering out of doors night photography. Armed with a camera such as a Kolibri with F 2 Tessar, Peggy F 2.8, Contax with F 2 Sonnar or Tessar F 2.8, or Leica with the F 2 Summar or 3 in. Hektor F 1.9, or Dallmeyer Super-Six F 1.9, many snapshot exposures with camera in hand may be made with the certainty of good negatives. And the small Rolleiflex, that little masterpiece, is

splendid for this class of work. Note the rapid action and full exposure in the four night snapshots (see illustrations 14, 15, 16, 17), which demonstrate the capacity of the Rolleiflex camera used in securing them.

Before setting out on your nocturnal expeditions, load up with Kodak or Agfa Super Speed Panchromatic Film, and make sure that the lens is opened to its widest aperture.

If one makes for the brilliantly-lit city oases such as cinema and theatre entrances, brightly illuminated big shop windows or underground railway stations, a little patience will soon reveal several incidents worth securing. Should one be felicitated by gleaming roadways and sidewalks after a shower of rain, so much the more for self congratulation.

Open the lens to its biggest stop, set the shutter to the longest automatic speed that experience has shown you practical without camera tremor during the exposure and watch for the interesting episode or unusual composition.

Where very close up, dark masses are to be included, a snapshot will not usually be long enough to register detail, and as long as moving figures are not in the field, although small groups at rest may be included, steady the camera against a shop front, a light standard or a post box, set the shutter to brief time, and give one to five seconds, according to the strength of the illumination.

It is usually too troublesome and provocative of curiosity to set up a tripod for night work, but a single leg support such as Sinclair's Unipod, is quickly and unobtrusively brought into use, and

allows of several seconds exposure without movement of the camera, besides being available for use at any point, thus making one independent of immovable supports, with all the advantages of choosing the most effective position. Indoors, using Kodak Super-Sensitive and Agfa Super Panchromatic Film, snapshots can be made with confidence if your lens is about F 2 aperture. The photograph of the group with the man lighting his cigar (No. 32) was made under the ordinary illumination of the room at eleven o'clock p.m. with a Krauss-Peggy fitted Xenon F 2 lens, exposure 1/5 second.

The slow automatic speeds and their smooth, vibrationless release are a very valuable feature of the Peggy camera.

The wonderful little Rolleiflex, used for making the night snapshots in the city streets, shows how well the movement and life has been captured with the F 2.8 Tessar at 1/25 and 1/50 second. Slower exposures still can be given with the Rolleiflex, if necessary, on account of its firm support from the neck strap when held so as to stretch this taut.

Beginners in this fascinating field should note that the developed film of night exposures will look so different from that of daylight snapshot film strips as to cause dejection. Do not worry. Remember that the greater area of the negatives represents darks, and though the little frames look almost like clear film with a few spots of deposit here and there, the prints will surely be satisfactory if the exposure has been sufficient.

Keep in mind, too, that with film records of night-

time incidents containing as they must, large areas of almost clear gelatine, the precautions against scratches or marks of any kind must be redoubled.

Anticipating for a moment the chapter on enlarging, it will be found that the most pleasing enlargements of night pictures are those made on a somewhat rough surface paper such as Kodak Royal Bromide, toned a deep brown and then treated with dope to give a depth and lucidity to the large shadow portions, which may otherwise look somewhat heavy.

Competition Photography.—Those who wish to secure among their record photographs, subjects for entering in the competitions run by many papers offering tempting cash prizes, will find that snapshots with plenty of wholesome sentiment are the most likely to score.

Quite simple little incidents, if quickly snapped, will often win out against elaborately posed arrangements, or scenes lacking the human interest.

Ever ready and unobtrusive, the miniature camera can capture a dozen prizeworthy subjects within a minute.

A mother and child portrait may be very good, taken in the usual way, but it will not secure a prize. But watch for mother bending or kneeling to kiss the kiddy setting out for school, fire off your shutter and there is a good chance of a prize from the subsequent enlargement.

It is best in all attempts destined for competitions to include natural action well in the foreground and to let them register joyous emotions which appeal

to all human beings, and so will catch the appraising eye of the judges. See illustrations 11, 12 and 13.

Miniature cameras which allow of the almost instantaneous change of film without taking the eye from the view-finder are prolific in securing really attractive competition prints. Film is cheap enough to expend a whole spool, with the likelihood of securing among the dozen or two negatives a real winner.

Let me add a reminder, that, in the excitement, camera movement may occur if one is thoughtless. It is a good thing to keep the lens wide open and speed up the shutter as one means of lessening the risk, but it must not be overlooked that even a 1/100 second is not too rapid to neutralise a shaken camera during exposure.

Practice with a few rolls of film, at different shutter-speed settings, with the camera at eye level, will be the simplest and cheapest way of learning ones ability to give a snapshot at immediate decision, without destroying the critical definition through camera tremor.

It should be known that the Compur shutter makes the exposure when the trigger release is at the end of its movement downwards. The camera must therefore not be allowed to move until the motion is entirely completed. Always operate with a gentle squeezing motion, supporting the camera from beneath, softly squeezing trigger and camera towards each other.

This will neutralise any camera movement upwards or downwards, and allow of automatic exposures of 1/10 second, when the camera is used

at eye level, without danger of blurred negatives. Where waist-level finders are used, such as that attachable to the Ikonta or the Megoflex, and the Rolleiflex and Pilot twin-lens finder, it is not difficult after a little practice to give 1/5 second without a tripod and yet secure sharp negatives.

Vacance Photography.—Before the coming of versatile, precision miniature cameras and ingenious adjuncts, photographers contemplating a yearly holiday used to spend a thoughtful length of time in deciding what equipment to take.

Having planned out a kit complete enough to tackle all the multifarious subjects likely to present themselves, half of it had to be omitted through considerations of bulk and weight.

Modern miniature camera owners are in the happy position of being able to take all they are likely to want, in the way of both apparatus, accessories and negative material, without any burdensome addition to their regular baggage.

In this section I am taking it for granted that the reader is desirous of doing good and perhaps valuable photography.

He may be resolved to obtain the nucleus of his future exhibition pictures, or a systematic record of the peculiar characteristics of the place and its inhabitants.

Again, he may have in mind the making of a permanent record of some special industries or customs of the natives, or should he be going farther afield, the recording of wild animals in their native haunts.

To all such photographers the availability of apparatus and accessories in perfect working order is a matter of prime importance, and I shall give some suggestions helpful to the less experienced.

My own predilection is for the small reflex type of miniature camera, which I find most satisfactory for most of the subjects I wish to photograph, and, as indispensable complements, a pale and a medium-tinted light filter, a pair of Proxar lenses for photographing small items and inscriptions at close range, and a lens hood.

A meter too, is, of course, a pre-requisite and although the cost is practically as much as that of a camera, I should like to recommend the Weston Photronic since I find this, amid all circumstances, the instrument that relieves the serious photographer of all doubts as to the correct exposure of the film. Another very good meter at a much lower price is the Dremoscop, a special pattern of which is supplied for the Leica camera.

What not to photograph is often a problem. There is, to the new arrival in fresh and strange surroundings, such a plethora of subjects before his eyes, that he is apt to make hundreds of exposures in his enthusiasm that he will not value very much in his succeeding calmer moments.

Such subjects with no interconnected interest, no thread of continuity and of insufficient originality will in many cases never reach the printing stage.

It will be far more profitable to have some method and an end in view.

Here I would stress a bit of calm beforehand rumination and a little planning out.

For example, there are many localised industries, now dying, of which the photographer on vacance might well make a series of photographs, not forgetting a few exposures in the new angle manner.

Such may even pay the cost of the holiday. I shall have more to say about this aspect in Chapter VIII; at present I will simply remark that there is little difficulty in writing a short, factual article around a series of these connected photographs, to accompany a dozen or so of clean, crisp 7 by 5 or whole-plate enlargements, and receiving ultimately good payment from one of the popular magazines or reviews.

When photographing in the narrow streets of oriental towns, locations which afford such a wealth of subjects, teeming with life and incident, it must not be overlooked that in spite of the intense brilliance of the light, the shadows are very dense by contrast owing to the general clarity of atmosphere.

Exposure, therefore, must be ample enough to register the detail in these shadows, and here the short focus of the miniature camera lens allows us to use a big aperture and still retain sufficient depth of definition while giving the film full exposure even at a fairly rapid shutter speed.

For this class of subject, the right angle viewfinder supplied for the Leica is often invaluable in preventing camera conscious persons. I have found, too, that the small Rolleiflex can be operated with perfect ease when aimed at right angles to the position I am facing, and this little camera, almost invisible as it hangs from the neck strap, gets the

subjects unknown to themselves in a very gratifying way.

The little Rolleiflex can be operated also with ease for back snapshots by pointing the lens through the crook of the arm and watching the image on the screen, while apparently interested in the opposite direction. The Brilliant and Pilot can be similarly operated.

Much can be done to balance the composition of street snapshots by getting a cast shadow or some not too obtrusive object in the foreground of the scene. (See illustration No. 3). A street vendor or a newsboy comes in handy for this purpose, but he should not be aware of the camera. (See illustration No. 10).

When including buildings, there is no objection to a slight upward tilting of the camera if the amount desired cannot otherwise be got into the picture space.

It is only when the chief *motif* is purely architectural that absolutely rectilinear lines are important. I have never found the absence of a rising fount on my miniature cameras a serious matter.

For more than 90 per cent. of the diverse subjects that interest us, a rising front is quite unnecessary. Its absence means a gain in rigidity and precision and more than outweighs the theoretical value of its presence. (See illustration No. 20, " Construction.")

Rolls of film exposed during ones holidays afield should be very carefully packed in their original wrappings and cartons and kept in a tin box for

safety until the return home. It is not of much use to take meticulous precautions against dust and pressure markings up to exposing the films if they are not treated with the same care afterwards. The excellent casing of the new Leica Perutz film, described in Chapter III (Part 2), affords adequate protection of itself, and for this reason is recommended here.

Chapter V

PICTORIAL PHOTOGRAPHY

MOST photographers will have read in one of the leading photographic journals, the series of interviews with prominent pictorialists, which the journal has been giving over a period of some years.

Along with the written matter, reproductions of their work appear, many of the artists stating the kind, size, and sometimes the weight of the camera or cameras they habitually use.

According to the statements of about two hundred of these workers, they secure their original negatives, with a few exceptions, by means of cameras other than miniature ones.

Some use a half-plate field camera or handstand universal type of instrument, but mostly the type employed is a quarter plate focal plane shutter reflex camera.

Readers have asked, justifiably, in view of what these pictorialists have said and the examples of their achievements: "Where and how does the miniature camera stand in this matter of serious pictorial photography? Is it efficient, or does it fail in this branch of the art?"

Two considerations have been overlooked. First, the majority of arrived pictorialists have been

practising for many years and were already well in their stride long before efficient and precision-made miniature cameras were obtainable.

They selected for their work what they then considered the best cameras, became familiar with and mastered them, continued to employ them and still use them since they find their choice adequate to the special class of photography they pursue.

It does not follow that these pictorial photographers would not have a like success if they were to begin to use a modern miniature camera. To suggest this would be invidious, for it would mean nothing less than that the camera is more important than the artist. Which brings us to the second consideration.

Anyone who gives the matter five minutes' reflection will have it brought home to himself that the essentials of good pictorial photography depend upon a number of things entirely remote from the shape, weight, make or size of the camera used to expose the plate or film.

Successful artistic representations by the graphic media call for distinctive personality in the creator. Imagination, feeling for mood and the ability to express them are his necessary qualifications. Study and practice in general art principles are called for, and of great importance are the ability to judge the pictorial possibilities of a subject, appreciation of the effects of lighting, composition, and arrangement.

With such qualifications, a photographer technically competent can produce pictures that will appeal

to us on æsthetic grounds. Without them he may startle us by his fidelity to truth or by his whimsical way of presentation, but his productions will not kindle within us a sympathetic mood.

Cameras, lenses and films know nothing about mood, inspiration or appreciation of values, yet it is a true though strange fact that if these are present in the camera worker they will eventually make themselves apparent in the final print even though the instrument itself did its work almost automatically.

Pictorialists and those who feel attracted to pictorial representation and expressionism by means of photography may be assured that the artistic merit of their photographs will not be conditioned by the size of the negative image.

The whole truth is simply a matter of technical and operative efficiency and if a miniature camera can satisfy these demands, then its suitability or adequacy is not in question.

And the proofs are overwhelming for those who have eyes to see. Here and there we are told by an exhibitionist that he uses nothing but a Leica camera for all his work. Another confesses to the employment of a Makinette or a Contax.

Some of the finest exhibition prints had their origin in a tiny square frame made with a Rolleiflex.

Annuals such as *Photograms*, "*Studio*" *Modern Photography*, *Deutsches Lichtbild*, and *La Photographie*, contain large, beautiful pictorial photographs, many of which were made originally with one or other of the miniature cameras described in Chapter II.

I think enough has been said as to possibilities; it is now appropriate to show how the miniature camera is employed in pictorial photography.

Classical Pictorialism.—This handbook not being a treatise on pictorial photography, I shall not dwell too freely on such matters as Composition Arrangement or Lighting. Many informative works are to be had dealing with these and general pictorialism. I am rather considering the use of miniature cameras, and their technique, in securing perfectly satisfactory negatives from which the final exhibition enlargements are to be made.

Still, in the interests of completeness and the possible appreciation by beginners of a little guidance, a few important hints will be incorporated as occasion suggests itself.

It is, as I have said, mainly in the matter of procedure and technique—where these differ, as they do in some respects, from those followed with bigger cameras—that pictorial photography with miniature instruments is chiefly concerned, and perhaps the first consideration is that of the number of magnification in enlarging which the photographer is desirous of making.

Retention of quality is, of course, the principal thing, and I may say definitely that the quality of the original negative can be retained up to and beyond an enlargement of 20 by 16 inches, which I fancy is as high as any exhibitor will reasonably desire to go.

But quality in the highest degree must be resident

in the negative itself, and it can be ensured in the first place by entire absence of movement of the camera during exposure, and by a deliberate calculation of the exposure.

This latter must be in outdoor work, neither less than half nor more than the minimum which a carefully used and familiar exposure meter tells the photographer is approximately correct.

I wish to stress this last paragraph, for years of experience and the examination of hundreds of unsatisfactory enlargements by other miniature camera users, has taught me that insufficient attention to the matter of a perfectly steady camera, and in particular, over-exposure, are the root causes of loss of quality in the big prints made from miniature camera negatives.

Using superlatively equipped miniature cameras in the modern spirit there is an exhilaration in making a quick decision; handling the camera snappily and giving the fast shutter exposure from the rapidly seized new angle viewpoint.

There is also a joy of another kind, which comes of deliberate procedure, in calm contemplation of the scene before one, in feeling the mood of nature and in selecting the ideal station point, and now we are in the realm of artistic and pictorial photography.

For such work the use of a tripod, if possible, however short the actual exposure, is recommended. It allows one to fix the camera in the best position and ensures that it will be quite steady during that exposure.

Then the exposure can be calculated to a nicety, a light filter put over the lens and its factor allowed for. The shutter can be set to the nearest marking, released with a long flexible cable and looking ahead a little, the quality of the big exhibition print is no longer in doubt.

Another indispensable factor is the true suggestion of aerial perspective, without which there can be no real pictorialism. And here it may surprise some readers to learn that frequently the miniature camera is superior to the field, the handstand or ¼ plate reflex camera!

Many users of these larger cameras fitted with necessarily much longer focus lenses possessing but a shallow depth of definition at moderately large apertures, mostly believe erroneously in the advantage of, and extol, this lack of depth. They think that out-of-focus planes are a proper rendering of aerial perspective, and they consider fuzzy backgrounds and distances as pictorial.

Nothing could be further from artistic truth. All planes in a pictorial photograph should be firm, the aerial perspective should be evident in a general lightening of tone as the distance is approached.

This is where the miniature camera wins out, no matter how large the relative lens aperture; and frequently it must be large in conjunction with a fairly high shutter speed to stop the motion of such things as branches or foliage moving in a breeze, running water, cattle, appropriate human figures unconscious of their being included, harvest teams, vehicles and so on.

The exposure can be correct and yet planes other than the principal one will not all lose form, and this valuable power, in connection with the proper exposure upon modern double-coated, highly orthochromatic film, through a pale light filter will result in a negative often far superior as the seed of an exhibition print, to one made with a five or six inch lens used at F 4.5.

Examine, for instance, illustration No. 44, entitled, "Peaceful Vale." Note the natural aerial perspective, yet the remote distance, miles away, is almost sharp, nearly as much as the principal foreground tree only a few yards distant from the camera.

This picture was made with a small Rolleiflex and F 2.8 Tessar used wide open, with a filter on the lens. Wind was blowing fairly vigorously at the time and the exposure had to be rapid (1/100 of a second in fact). Such a result would have been impossible with a larger camera.

This picture, by the way, is an example of the circular composition, one which is very effective in keeping the interest well within the framework of the picture.

Another example showing the superiority of the miniature camera is the illustration No. 41, entitled "Dormant." Here no large camera could have been used. I could secure this only by pointing the camera through the close set bars of a locked gate and giving a rapid snapshot at full aperture. Yet again, there is no chaotic or unnatural blurring of the background which is part of the story I wished to convey.

I had to twist the little camera awkwardly in order to get the harrow in the correct position, and it would have been impossible to keep the camera steady enough with an exposure longer than the 1/100 second actually given.

Note, too, in these examples, the general sharpness and quality, as far as the reproductions show, of the enlargements, which are in no way inferior in these respects, to similar enlargements from 9 by 6 and 12 by 9 cm. negatives.

The requirements then, of the pictorialist, are adequately met in precision miniature cameras which entail no burdensome bulk and weight after what is often a long and tiring journey in seeking out the best subjects to fit ones moods.

A light filter and a pocket tripod do not add appreciably to the bulk or weight of equipment, and for my part, although I have several large and expensive camera outfits, they are not likely to be used for pictorial landscape work.

It will be seen from an examination of the illustrations that they reveal no evidence of unnatural or violent perspective, although they are enlarged from practically the whole of the negatives made with lenses of five and six centimetres focal length. This shows clearly that constantly recurring statements about short focus lenses being unsatisfactory for pictorial work because of the unnatural perspective effects they are supposed to give, have no foundation in fact.

I have used lenses of short, medium, long and very long relative focal lengths over a period

exceeding a quarter of a century, and I sometimes think that those who advocate long focus lenses alone as being suitable for pictorial work are less familiar with optical principles than with rules of composition.

New Angle Pictorialism.—It is important to realise the difference between the New Angle "stunt" or commercial and advertising photographs and the pictorial or artistic New Angle photographs. The first kind are concerned purely with pattern whereas the latter, while incorporating pattern, reveal form, composition and *motif.*

New Angle photographs without these qualities in evidence will possess a temporary interest only, while if these qualities are present they come into the realm of pictorial photography.

It is the tendency of modern artistic photographers to express themselves and the subjects they choose, entirely by the legitimate and full employment of the qualities of pure photography alone.

Exhibitionists who work along classical lines often seek to make their final prints portray their ideas by adventitious aids such as manipulation during the projection printing; the use of diffusers and diffusion lenses; oiling up and strengthening parts of the print, or Oleobrom, Bromoil, and Transfer.

When such practices are indulged in without destroying artistic truth, and where handwork is not apparent, it is a matter of individual opinion

whether this interference with the medium is justified.

But pure photography skilfully executed by an artist is a beautiful and unique method of expression and is now recognised as holding a high place among the Fine Arts.

Precision miniature cameras are playing a leading role in the rapid and extensive advance of New Angle Pictorialism. By virtue of their ever readiness and boundless capacity they give the artistic photographer the power to seize, immediately and successfully, the virile and striking compositions with which he meets amidst the swift movement of modern life.

But note that for real pictorial new angle photography, we must be able to recognise the fit and proper subject, which means the cultivation of vision, the having something to tell, the incorporation of mood and form as well as pattern.

Beginners, then, should acquire some knowledge of general art principles, be ever alert and observant and above all, have a motive. What it is desired to express, or represent, should be quite clear in the mind before the film is exposed.

Almost every mood is representable in pure photography given suitable material under appropriate conditions. Stunt photographers photograph striking or bizarre shadow patterns because of their unusual pattern alone. Artistic workers do so because they feel that some quality, in it or of it, suggests itself as a suitable ingredient whereby they can express a personal mood.

Whereas the novelty only of the subject appeals

to the former, to the latter it is what the subject can be made to suggest, apart from its obvious features, that moves him to photograph.

For example, the pictorialist suddenly coming upon a shadow pattern in a byway, perceives instinctively that by photographing it from a particular angle he can use it to suggest say, grotesquerie, or impending disaster.

It is difficult to express in words exactly how commonplace objects can be made to convey, by an artist, moods which have no connection with the objects themselves, but that they can is a recognised truth.

Throughout these essays in pure photography as an artistic medium, the two demands of æsthetic and technique must never be absent from the mind.

Emotionally, we have to be ever susceptible to the feeling excited by potential subjects, and we must not allow the startling qualities of pattern to dominate us exclusively. Composition, either of line or tone, there must be, nor is it beyond the artist to embody them if he has the patience to wait for or seek suitable circumstances.

Technically, we must remain as calm and scientific in our operations as the trained physicist. The camera must be held rock rigid, correct minimum exposure must be known, and later, developing and subsequent treatment must be carried out with one eye on the thermometer and the other on the clock.

We have no reason to disbelieve the statement that artistic representations are the result of

emotions carried forward into periods of tranquillity, and these words might well have been said prophetically, about Artistic Photographers with New Angle Vision, equipped with Modern Precision Miniature Cameras.

Chapter VI

PORTRAITURE

PORTRAITS that Please.—Regarding the diverse subjects in the depicting of which photography may be delightfully and profitably employed, I am convinced that it affords its most interesting activity in the making of portraits, premising that the true personality of the sitter is faithfully recorded.

Real portraits must exhibit this personality of the originals if they are to be anything beyond a map-like record of face and figure.

Have this personality fecundating your portraits and they will evoke the interest and admiration of a circle far wider than that of relatives and familiar friends.

One secret of making distinctive portraits lies in paying particular attention to the eyes. Not only must they be focussed dead sharp, they must be constantly watched closely for their expressiveness, since the expression of the eyes reveals the personality of the subject more than anything else.

Rapidity in making the exposure at the right instant is absolutely essential to capture this unmistakable and vivifying expression immediately you see it in the sitter's eyes.

Hence, the speedy short focus lens and quick

automatic film change of the miniature camera give it an incalculable advantage over bigger instruments.

The Leica, Contax or Peggy, equipped with a Megoflex attachment, permits the photographer to concentrate his attention on the eyes, keeping needle-sharp focus and watching for the telling expression at the same time, and in a second the resetting of the shutter puts a fresh frame in position for the next exposure.

The small Rolleiflex with Tessar F 2.8 is wonderfully efficient and rapid in manipulation, a half turn of the handle and a touch of the thumb on the shutter-setting lever, without taking ones attention from the focussing screen, resets the camera for another shot.

These facilities are needed, since it is desirable to make a dozen exposures in rapid succession in order to be sure of getting three or four negatives that have caught the expression we are after.

Women no longer young prefer in their portraits youth and beauty rather than dramatic lighting or posing. It is, therefore, best to have plenty of frontal lighting, short of destroying modelling, so as to minimise as completely as possible any haggardness, worry lines and shadowed hollows in the cheeks.

In modern portraiture with miniature cameras I find a somewhat flattish illumination, twice the meter exposure indication, and Verichrome, Selo "pan," Agfa Plenachrome or Lumiochrome film, and where the colouring indicates it, a 2X filter, ensure the requisite quality in portrait negatives, and moreover they obviate the need of retouching.

A lot of retouching is needlessly entailed through unsuitable lighting. If this is so directed as to accentuate, or even show up naturally, lines, hollows and tiny skin protuberences which have to be laboriously touched out later, it is surely logical to remove the trouble at the source by studying the lighting and flattening it rather more than is usually the practice.

As far as amateurs are concerned with indoor portraiture, the lack of a studio is no drawback. In my own practice of Home Portraiture, that is, in sitters' own dwellings, I have long since discarded portable backgrounds and reflectors, nor do I block up the lower parts of windows.

I work in ordinary rooms, mostly as I find them, but when I use daylight, I try to have a room on an upper floor where the light is stronger, owing to the less-restricting surfaces of near-by houses.

But the rapid lenses on miniature cameras, which need no stopping down for full-length figures or small groups, make shutter exposures easily possible with one or other of the portable and powerful electric photo lamps, so that one is independent of the hour or weather, winter and summer alike.

A Leica II with 50 mm. F 1.9 Dallmeyer Super-Six, and a 73 mm. Hektor F 1.9 plus the Megoflex Reflex attachment, or Contax with 50 mm. F 2 Sonnar, are my most cherished and profitable possessions for portraiture, and the little F 2.8 Rolleiflex is no less valuable.

In use the camera is fixed upon a metal tripod with a ball head, and having rubber shoes on the points to avoid scratching polished floors. I ascer-

tain the correct exposure by simply directing my Weston Photronic meter at the subject and giving about double the indication.

With three-quarter, full length or small groups the camera should be operated at about eye level, and for this height I use Leica or Contax and focus with the range finder.

When photographing seated persons (for large heads), children and animals, I use a Leica or Contax with the Megoflex attachment, or my small Rolleiflex, obtaining critically sharp focus with the magnifier in the hood.

During the warmer period of the year excellent garden portraiture can be done, and the great advantage of being able to make rapid snapshots of lively children and frisky domestic animals, follow-them up with the camera in hand, making twenty or thirty exposures as appealing expressions and charming posings occur, is obvious.

Diffused light is usually advisable in outdoor portrait work in order to avoid harsh shadows and half-closed eyes, but delightful effects, which one rarely sees among outdoor portraits, can be made in full, blazing, even noonday, summer sunshine.

I cordially recommend this type of portraiture to both amateur and professional. It is fairly novel, extremely beautiful, arouses admiration, and finally is profitable.

Simply get your subject with the sunlight overhead or almost behind, and let her (it will usually be her) hold a parasol over the head ; the fabric must be very translucent and for preference pale pink or blue.

This gives a soft, overall diffusion and I may remark that this method is very kind indeed to those of mature age, or with evidences of worry in the facial characteristics.

Double meter time ensures full exposure, and if your subject is very fair, a pale light filter will effect a further improvement.

Remember to use a lens hood, or the rays of light may strike the lens. Filters supplied for Leica, Contax and Rolleiflex are so flanged that the outside diameter is the same as that of the front lens cell. The lens hood can, therefore, be used on the filter.

Professional studio work is carried out on almost similar lines to that of indoor home portraits. I have in readiness for this work a Leica with 73 mm. Hektor F 1.9, at eye level for large heads and the Rolleiflex at waist level, being thus prepared for forty-eight exposures without reloading.

An Ensign Multilite unit lighting equipment is ideal for illumination and however many units are employed one plug point only is necessary.

For general lighting the Triple Standard Multilite No. 4 is the mainstay and is moderate in cost—£5 15s. The addition of a small floor unit No. 1 allows of all kinds of lighting effects to be secured at will.

Money-making Portraiture.—Equipped with an automatic miniature camera the making of what I call Series Portrait Albums is a novel, pleasing and profitable line. It is strange that so little of it is done.

I had a young man, who was taking up an appointment for some years abroad, come to me to ask if I could do him a dozen or two photographs of his fiancée, which he would like to take with him.

I made twenty-four portraits, all different poses ; some full length, some three-quarter and some big heads, varying the lighting.

From the strips of Leica or Rolleiflex film negatives, two dozen cabinets were printed and mounted in an album. The man was delighted with the diversity of poses and the idea of a special album for the one person. He ordered three extra albums for the lady and his relatives, and gladly paid well for them.

These series albums are easily within the scope of amateur miniature camera owners, and, of course, the subjects can be photographed indoors or out.

I fancy a few such albums of a lovely and lively child would please parents greatly and prove a good source of profit for spare-time work.

Three dozen negatives can be secured for a few shillings and an ample selection made of the best two dozen from a Leica or Contax spool or three rolls of Rolleiflex negatives, so there is no anxiety on the score of expense.

Make it a practice when doing serious work, especially for payment, to be generous with film. You can afford to be when using a miniature camera.

Profitable Home Portraiture.—Amateurs can easily cover the cost of their miniature camera and its running expenses and make a profit in addition.

Home Portraiture is little practised in comparison with studio work, and the field is really wide. Good portraits can be supplied at reasonably low prices and yet afford a good margin ; nor need it be thought that by taking up this work one is competing unfairly against the professional.

Few of these bother about portrait work outside the studio, and it will be found that most people who are prepared to have portraits made at home would never trouble to visit the studio.

A start can be made by compiling a few portfolios, each holding a dozen half-plate enlargements of pretty children, small family groups, and dogs.

Such portraits look well mounted on plain sheets about 12 by 10 inches.

Having selected a locality, a portfolio can be left at each of a few promising residences, with a little typewritten brochure describing your service and quoting the price.

I do three half-plate portraits, mounted as mentioned above, at five shillings, and this is very reasonable, yet leaves quite a good profit.

The work can be done at any time of the year or at night, independent of weather conditions, by carrying a Home Portrait Reflector. This is supplied by Messrs. Sands, Hunter at the moderate price of 21s. With Super Panchromatic film and F 2.8 1/5 and 1/10 second will secure full exposure with subjects 4 to 5 ft. from the light.

Portfolios are collected a few days afterwards, orders solicited and an appointment made for taking the portraits. There will be few blanks, especially where there are children.

A roll of miniature film of twelve or sixteen exposures covers four or five different subjects, giving three exposures on each for safety, and if all are good, three different poses can be submitted for the five shillings.

On many occasions, I have had four orders in one household, representing a pound, not bad for two hours' work on a spare evening. Moreover, repeat orders for copies keep coming along, which is more profitable still, since there are no negatives to make and no journey to take.

As to equipment, which can be carried with ease. In addition to the electric lamp, a small tripod with ball head, an exposure meter and a spare roll of film are all that is necessary.

If any amateur is thinking of buying a camera, especially for this work, I would suggest the Rolleiflex. If he has already a Leica or similar camera, the addition of a Megoflex attachment is recommended.

Chapter VII

RAPID ACTION PHOTOGRAPHY

IN one respect, this class of camera work differs from others, in the performing of which we rightly regard correct exposure of the film as the first law.

When photographing rapidly moving objects, however, the important factor is the arrestation of motion, and exactitude of light action on the sensitive emulsion surface and perfect composition of scene and figures are no palliation if the principal moving object or objects present a blurred image instead of a clear-cut outline in the finished print.

It is not the actual rapidity of the object itself, but the movement of the tiny image on the film during the period in which the shutter opens and closes, that determines the speed to which the dial must be set.

This fact is frequently overlooked, although many subjects are in the rapid action class which are apparently entirely remote from this sphere.

An express train travelling at sixty miles an hour, photographed from a great distance, or an airplane speeding at a hundred and fifty miles an hour, are moving with great actual rapidity but the image moves slowly on the film by reason of the distance away of the object.

Whereas in a close-up portrait of a lively baby or frolicsome doggy filling the whole picture space, parts of the subject, especially the limbs, move with great velocity on the film.

This kind of work, then, it must not be overlooked, is, photographically speaking, rapid action photography, and comes in the same class as swift vehicles in the city streets. See " Town Traffic," No. 55.

In these circumstances the shutter cannot be set with safety at anything longer than a hundredth of a second and since the subject is close up and therefore contains dark shadow areas, a large aperture in the lens is necessary for sufficient exposure of the film.

Moreover, in order to be sure of one or two perfect results, an ample number of shots is called for in quick succession almost without taking the eye from the view-finder.

We see once more how inevitably the miniature camera is indicated as being the most satisfactory for this type of work, since the full aperture of the lens is needed, a rapid shutter speed called for, and we are taking dark near objects requiring four to eight times the exposure of a normal subject.

The little terrier in illustration No. 53 was racing about, close to the camera, and I secured a fully exposed, sharp negative at 1/100 second, with a Pilot reflex camera, using the Tessar at F 3.5 and Selochrome film.

Again, picture No. 38, " Babes in the Wood," though not at first sight a very rapid action subject, yet called for 1/125 second on account of the rapid

motion of figures and especially the limbs. Even this speed failed to stop the motion entirely and I might have given 1/250 second with advantage. This picture was made with a Leica on Agfa Isochrom film, at 9 p.m., in September.

No. 54, "Cascade," is another type of rapid action photography, and received 1/100 second with Compur shutter on Kolibri camera, using Zeiss Ikon Ortho Ultra film.

In tables giving exposure fractions for different classes of moving objects, it has been the custom to provide tabulations of elaborate details such as focal length of lens in use, distance and kind of subject and direction of motion relative to aiming of the camera, in order to arrive at the precise speed at which the shutter must be set.

All this mass of information, while interesting enough in theory, is practically useless at the time of photographing. In rapid action photography, on the spot we have no means of knowing the speed, distance or angle with any certainty, and if we had, before we could make every precise adjustment accordingly, the performers would have gone home to tea.

For snapshot and high-speed exposures with miniature cameras, it is best to consider all possible subjects as coming into three groups only, and to use one or other of three predetermined shutter speeds, then taking advantage of the large lens aperture available in combination with its sufficiency of depth of focus ; whatever the classification, to set the shutter at the appropriate marking, and in the second and third groups, regardless of the strength

of light prevailing, to open the lens diaphragm to its maximum, thus ensuring a rapid enough speed to stop the motion of the image on the film, while at the same time getting sufficient light action to avoid under-exposure.

Following the advice above, the miniature camera photographer will find all necessary information in the table given on page 97, which I have worked out for use with lenses of 5 or 6 cm. focal length (*a*) in Compur shutter, (*b*) for Leica, (*c*) for Contax.

Although both Contax and Leica are fitted with focal plane shutters of fixed tension and adjustable slit (this is automatically altered as the speed setting is changed and needs, of course, no separate attention), working with similar close proximity to the film surface, separate tables are given, since in the case of the Leica, the shutter travels horizontally, while in the Contax it travels vertically, assuming, as is usually the case, the camera is positioned for a horizontal or " landscape " view.

For exposures in group (1) the direction in which the focal plane shutter travels is of no consequence, but in groups (2) and (3) especially when objects cross the line of sight, the direction in which the shutter blind travels in relation to the direction of motion of the image *on the film* does occasionally make a difference.

If a racing motor, for example, is travelling at 60 m.p.h. from left to right of the photographer, the image on the film moves from right to left. Now suppose the focal plane shutter is set at 1/500 second at which speed the slit will be narrow; if upon releasing it the slit travels across the film in a

direction contrary to the moving image, it is clear that a more sharply cut image will result than when the slit travels in the same direction as the image.

In this latter case, the shutter opening is following up the image, and there is greater likelihood of undesirable softness showing in the subsequent enlargements than there is in the former.

It is advisable, therefore, when dealing with subjects in group (3) with the Leica, to hold the camera in such a position that the shutter runs in the same direction as the *object* is moving, and this can be done by simply turning the camera upside down, as the case demands.

The Leica shutter, when the camera is held in the normal horizontal position, moves from right to left, and is therefore in the best position for high-speed objects travelling in the same direction. When they cross the field from left to right, turn the Leica upside down.

Contax shutters, when the camera is held horizontal, travel from top to bottom, for this reason, in order to obviate any blurring of the image, it is necessary only to increase the speed.

The Contax shutter goes up to 1/1000 of a second, so there is ample room for the needful adjustment and I may say that according to my speed tests of the Contax shutter, it is remarkably accurate, the 1/1000 actually registering 1/950 in cold weather and 1/900 in the summer, when, the temperature being much higher, there is a slight expansion and therefore lessened tension of the springs.

Most miniature cameras fitted with the Compur shutter which works between the combinations of

the lens, allow of exposures up to 1/300 second, the highest speed rating of the Compur. I have tested seven of these shutters as fitted to different miniature cameras reviewed in Chapter II and have found the actual speeds very close to those engraved on the disc. In no case has the speed marked 1/300 fallen below 1/250, and the light transmission efficiency, as far as I can ascertain, appears about 85 per cent. at the higher ratings, which is satisfactory.

When the Compur shutter makes the exposure the leaves open rapidly to the maximum aperture and then immediately close again, thus the whole of the exposure, whatever the actual speed, takes place at once over the entire film frame.

This complete action has the advantage of giving a sharper image of rapidly moving objects, speed for speed, than a focal-plane shutter; consequently a lower speed of the Compur suffices for the arrestation of motion, than when using a focal-plane shutter. In practice 1/300 with a Compur shutter will stop the motion which would call for 1/500 with a focal-plane shutter.

I wish to emphasise this matter of first-class diaphragm shutters being adequate for high-speed work, because I find many photographers not making use of them in the belief that they are not suitable for the type of photography with which this chapter is concerned.

In some speed subjects there is a very brief instant of time when "arrested motion" occurs. For example, horses or athletes going over hurdles or other obstacles. At the amplitude of their rise

there is a pause, before they descend, and this is the opportunity to watch for and snap.

It is, however, necessary to press the shutter release just before your subject reaches this maximum position in order to allow for the natural time lag which takes place between the eye's seeing the subject at a certain spot, and the transmission of the nerve impulse from eye to brain and from brain to finger muscle.

SPEED TABLE

Group	Subject	Compur	Leica	Contax
1	Average street traffic, children at play	1/100 second	1/120 second	1/100 Angular 1/200 crossing line of sight.
2	Foot racing Football Airplanes	1/300 second	1/250 second	1/500 second
3	Cycle racing Diving Express trains (60 m.p.h.) Racing Motors	1/300 second	1/500 second	1/1000 second

In groups 2 and 3, with Compur, do not take at a distance less than fifty feet.

Use F 3.5 as a minimum aperture. If dull, F 2.8, when available. The most rapid ortho films are presupposed in the camera for any rapid action work. Z.I Pernox is specially recommended.

The tenets of this book, as the reader is now aware, are the keeping of exposures with miniature cameras close to the minimum outdoors. In rapid action work we are, owing to the high speeds demanded, and frequently the absence of brilliant lighting, already working along the border line and under-exposure may become a danger.

Notwithstanding, inexperienced speed photographers are cautioned not to prolong the development time if the best possible enlargements are desired. Of course, in the case of journalist or press illustrations, where the record is of more importance than photographic technique, a more contrasty print can be secured from under-exposed frames, at the sacrifice of freedom from granularity. Here, with the foreknowledge that the film is under-exposed, it may be left in the tank for about one-fifth longer than the normal time indicated according to temperature and strength of solution.

Better, however, where the subjects are important and cannot be retaken, is to develop the film for the minimum time previously indicated and when finally washed to intensify it with Tabloid Mercury Intensifier, the best for this purpose, since it gives additional printing depth to the weakest silver deposits without destroying shadow details.

And this is exactly what we require in dealing with true under-exposure.

Use this Mercury Intensifier with great care as it is poisonous. If the fingers have skin abrasions, or non-healed scratches, rubber stalls or gloves are advised.

Intensification may be carried out in subdued light and its progress seen by holding up the strip of film to the light. When sufficient strengthening is reached, wash the film for about five or six minutes and then put to dry according to the directions given under film processing in Chapter III.

Chapter VIII

JOURNALIST, FREE LANCE AND COMMERCIAL PHOTOGRAPHY

THE Staff Reporter.—It is a matter for wonder that in this country so few journalists are photographers. Press photographers are, of course, well equipped with the orthodox types of cameras and a supporting collection of lenses of different foci, but the staff reporter is rarely armed with more than his note-book and fountain-pen.

Yet, an efficient modern miniature camera, a knowledge of its capacities and a mastery of its use are, and will be more so in future, indispensable adjuncts to pen, pencil and paper and the nearest telephone.

Reporters are frequently sent on assignments which are not considered to need the service of a press photographer, yet it may well happen that, after all, opportunities are there, or arise suddenly, which simply cry out for illustration.

Now the reporter cannot, like his photographer confrère, regularly carry with him a weighty and bulky kit on every assignment. He has a different function. He can, however, always have with him an equally efficient outfit in miniature, and I have no hesitation in saying that he will quickly realise that the most profitable addition he can make to his equipment will be a precision miniature camera.

And he will find that the comparatively short time necessitated in learning to use it with certainty is not wasted.

A Leica, Contax or Peggy with two-inch F 2.8 or F 3.5 lens can be carried comfortably in an ever-ready case when setting out on an assignment and will not be in the way nor thought of until wanted.

Perutz, Agfa or Zeiss Ultra Rapid film are sufficiently speedy for anything likely to be photographed in the day-time, while for meetings and functions at night, Agfa S.S. or Kodak S.S. panchromatic film will permit many hand snapshots of interesting incidents.

The photographs Nos. 4 and 5 of a Nazis' torchlight procession, show what the modern miniature camera can do in the way of difficult subjects. I would particularly draw attention to the fact that these photographs were made with the camera in hand, yet the exposure was an automatic one-fifth second. As an example of the remarkable smoothness of the shutter release on the Peggy camera, I fancy this performance merits all praise to the makers.

Another valuable feature of the Peggy is the ease whereby a small section of the film can be immediately cut off for development straight away; no small recommendation to the journalist photographer with hot news and illustrations. Perutz film for Leica and Contax is supplied in twelve exposure spools as well as thirty-six.

Where speed is of paramount importance in getting press prints from the negatives, the wet film, as it comes from a quick wash, can be enlarged

at once in the Magniphot by using the pair of Mirror Glass Discs supplied for this purpose.

Free-lance Writers.—But if the modern staff reporter is half equipped only, when without a camera, what is the position of the free-lance journalist who is not a photographer?

An examination of current dailies and weeklies reveals the trend in to-day's popular journalism—an ever-increasing use of photographic illustrations to the articles published.

Even quite short articles, such as the *Daily Mail* prints on the central literary page, are illustrated more often than not. Weekly magazines are using more and more photographs. *Passing Show* asks for articles accompanied by first-class photographs, and many others are coming into line.

Ability to write a saleable article is not enough to-day. Free-lance journalists should be capable of illustrating their work, and the indications are that the time is not far ahead when photographs will come first with the articles written around them, secondary.

Here, surely, is an urgent reason for free-lance writers to equip themselves with a small-scale photographic outfit, to illustrate everything they write and to seek out subjects which can be vividly picturised.

"Facts, facts, and facts," is the clamour to-day from editors, and facts abound everywhere and are the very prerogatives of modern photography.

Equipment in miniature for free-lances may be with advantage more extensive than that of staff men. Free-lances usually can and do work more

leisurely or deliberately than regulars. The former can spend more time in selecting and arranging subjects; they have more opportunities for choosing the most suitable make of film for the work in hand, or for the employment of light filters to secure better colour correction with some subjects.

Such aids as Proxar and similar supplementary lenses will be found indispensable for large-scale reproductions of inscriptions and carvings. An interchangeable long-focus lens of 5 or 7 in. focal length for use with the Leica or Contax often means a good image filling the frame, when close approach is impracticable.

I have seen some delightful and quaint character studies eagerly accepted by the editor, taken with a $5\frac{1}{4}$ in. lens during an imposing procession—not of the processionists, but of people watching them from upper windows.

Good, sharp, whole-plate enlargements on glossy bromide paper are the orthodox kind of prints to accompany articles. Such photographs are easily produced with one or other of the automatic projection printers described in a later chapter.

Profitable Commercial Work.—To the photographer who wishes to specialise in artificial light work and to whom an investment of about £50 is not a prime consideration, the outfits mentioned below will provide him with facilities for modern photography at night, such as will bring good profit.

Practically without limitation, so armed, he can stroll along the city streets at night time, making

snapshots at 1/25 or 1/50 of a second, of shop window displays, pedestrians and vehicles, of notables and celebrities arriving or departing.

He can make snapshots in the theatre, at banquets, functions and important meetings, and at the dog track, all of which will be adequately exposed.

I can speak enthusiastically of a Zeiss Ikon Contax fitted with 50 mm. Sonnar F 1.5, price £48 10s., and for the negative material, Kodak Super Sensitive Panchromatic film in the Contax light-proof spools, development of which can be carried out in the Bakelite Zeiss Ikon tank costing 17s. 6d., or the Leica Correx tank.

Another fine instrument would be the Leica III, slow-speed model with the Summar F 2 lens. The facilities offered by such a combination, the exquisite detail obtainable at F 2 and the certainty of securing full exposure even in a comparatively poor light, by taking advantage of the slow automatic speeds when no rapidly moving figures are near the camera, and using some support, such as a pillar-box or lamp standard if conveniently situated, would mean a considerable extension of the number of subjects that could be successfully attempted.

The 73 mm. focal length Hektor F 1.9 is also particularly useful, since in addition to great rapidity, the longer focus allows one to work from a greater distance and therefore less noticeably.

A lens hood should always be used in this kind of work, to prevent brilliant naked lights from striking the front glass of the lens and so fogging the film.

For perfect enlargements from the films, the

New Baby Miraphot automatic focussing vertical enlarger will turn out projection prints up to eight magnifications, rapidly, easily, and with certainty. This model is described in Chapter IX. From a section of a frame 1 by $\frac{3}{4}$ inch a full whole-plate enlargement is obtainable, needle sharp.

A good source of income can be derived from night snapshots of the many attractive window displays made by big stores. These are brilliantly illuminated and proprietors are usually pleased to welcome photographs of their window exhibitions, especially when they are taken with interested pedestrians looking at the goods.

Illustrated Advertised Goods.—Photographs that bring money are such as arouse in the beholder a feeling of lack until he or she has acquired what the advertiser is selling.

These photo illustrations will not be commonplace ones, but the result of original thinking and modern angle treatment.

No. 1, "Cigarette," is an example of the sort of photograph that creates desire. It is suggestive; it is not hackneyed; and it has some elements of new angle pictorial qualities. This photograph was made with a Contax camera, showing yet again the unlimited use of modern miniature instruments.

Advertisement illustrators often overlook the fundamentals of things in general. Success follows only from illustrating the appealing aspect of things and selling of service, rather than goods.

For example, if it is electric lamps you want to sell by your photographs, better than a photograph

of the lamps themselves, however picturesquely arranged, is the effect of the lamps. Show a room brightly and harmoniously lit up with them. Take a few photographs of a woman comfortably reading or writing a letter (close up), and dwell on the soft, beautifying effect of the particular electric lamp.

If your photographs are to sell somebody's milk, why not have a picture of fine cows feeding in a meadow, with the following descriptive wording:

OUR MILK BEGINS GOOD.
CONTENTED COWS LIKE THESE PRODUCE IT.

Then have an inset showing a hygienic steriliser or bottling department, worded thus:

AND IT KEEPS GOOD UNTIL
YOU USE IT.

For an optician I once made, instead of photographs of eyeglasses and spectacles, a beautiful landscape view, and another with blurred outlines. These showed what persons with uncorrected vision were missing in life. The wording accompanying the photographs was:

YOUR HERITAGE!
DO YOU EVER SEE IT IN ITS GLORY?
ONLY SCIENTIFICALLY CORRECTED EYE
DEFECTS WILL LET YOU ENJOY THE
BEAUTY OF THE EARTH.

Commonplace commodities should be photographed always in use, and preferably whilst in

motion. Jam does not look specially appealing in the jar. But have a pair of pretty hands spreading jam on a slice of bread; concentrate your light by getting close to the window or using your Home Portrait electric lamp on the bread and jam, and let the girl make different natural movements (slowly) meanwhile firing off a dozen shots one after the other rapidly, with your Rolleiflex or Leica, Contax or Peggy.

Always tell a story, and keep in mind that smiling faces are the only useful ones to snap for advertising purposes.

I offer what I believe is a novel suggestion which, if worked on, should make your photographs put over the goods.

Know the potential reader's slant or viewpoint, and then get it somehow in your illustrations. Look and listen as you go among people. You will hear a girl exclaim when she sees a charming frock, "Isn't it a dream?" Well, here is your clue. If you are going to photograph a frock get a suggestion of a dream or dreaminess in the environment or background.

These mere suggestions are offered as indications. There are thousands which will occur, particularly for small series of, say, half a dozen "in use" illustrations, rapidly taken in succession with an automatic miniature camera.

If, by the way, you photograph a person or vehicle entering the scene, let the entrance be from the left. The eye, from its custom of reading from left to right, feels something wrong or uncomfortable when it has to imagine itself following up a

moving figure from right to left. In any action photograph, therefore, where hands or fingers are doing something, see that the actual direction of the movement is as nearly as possible left to right or downwards.

Straight Illustrations.—In the matter of straightforward reproductions such as plans, photographs or the photographing of a complete "lay-out" ready for block making, modern miniature cameras are in no way behind their larger brethren.

Leica and Contax are supported by an amazing range of accessories for reproduction, micro-medical and scientific work. For first-class quality copying, the Small Rolleiflex and its special Proxar lenses are so minutely exact that the results are astonishing.

As an example see No. 8, a photograph (the original from which the block illustration was made is much enlarged), showing the remarkable sharpness obtainable. And when I say that this piece of newspaper advertisement was simply pinned on the studio wall, photographed at 1/10 second with the Rolleiflex held in my hands, and with *both* pairs of Proxars pushed one over the other, on the lenses, and finally, the exposure made at a distance of twelve inches at the full aperture of the F 2.8 Tessar—enough has been said, and the photograph bears it out, as to what the word "precision" means in modern miniature camera construction and lens making, and, it should be added, "perfection" in modern films.

There is a Collapsible Copying Stand made for the

Leica which packs into a case 12½ by 6 in., very useful and easily portable (it weighs just over 3 lb.), for copying away from ones own workroom as well as for work in ones own premises. An electric illuminating device is also supplied. Full details of these and other items will be found in the Leica handbook, which the manufacturers will send on request.

For miniature photographic reproductions of printed matter and diagrams a very fine-grain film is indicated, such as Special Perutz, or Zeiss Ikon Fine Grain. Exposure should be on the short side to obtain the cleanest-cut lines and good contrast.

My own practice is to determine carefully the correct meter exposure and then make half a dozen exposures giving one quarter, one half and one correct, and then duplicating for safety, in case one of the best negatives should be accidentally damaged.

Messrs. Leitz recommend Cine Positive film stock for drawings and printed matter, on account of its brilliant contrast-giving qualities, but personally I find those first mentioned quite suitable.

For the development of negatives of line and printed matter a metol-hydroquinone developer at half normal strength, with the addition of five drops of 10 per cent. solution bromide of potassium to each ounce of developer, is the best. This M.Q. solution, however, is not suitable for daylight tank developing, but since photographers who do much copying and reproduction work will have dark-room facilities, they will not consider this a disadvantage.

The Leica Developing Drum, around which the film is coiled and then revolved by a handle, through a tray of developing solution, is the most expeditious way of developing in the dark room. For V.P. films the Zeiss Ikon 24 in. enamel dish is useful.

If you have a Rolleiflex, and do copying at rare intervals only, you can obtain for this camera a supplementary plate adapter, focussing screen, and beautifully made single plate holders. With these auxiliaries a single glass plate negative on the standard size, $2\frac{1}{4}$ by $1\frac{3}{4}$ in. plate, can be made and developed at once. This is a great convenience and a really useful extension of the many facilities of this admirable little camera.

Chapter IX

ENLARGING AND SLIDE MAKING

PERFECT enlargements begin at the moment the roll of film is inserted in the miniature camera, and their ultimate realisation depends on the manner in which the whole series of operations right up to the dried projection print is carried out.

There is no escaping this unequivocal statement if the miniature camera photographer lays any importance upon the word with which this chapter opens.

Perfect enlargements being obtainable from perfect negatives only, we may summarise the essentials in the production of such negatives as follows:

(i) Rock-steady camera during exposure.
(ii) Minimum correct exposure (out of doors), not more than three times this minimum indoors.
(iii) Development of film not more than nine-tenths of normal time.
(iv) All processing solutions, rinsing and wash waters at approximately similar temperatures.
(v) Spontaneous drying of film in dust-free room.
(vi) Precautions against damage to the gelatine surfaces of the film.

Chapter III discusses the reasons and shows how to ensure these essentials in the negatives.

It will hardly need stressing that the second stage, securing perfect, big enlargements from the negatives, will be the more certain, the less hedged about with delay and annoyance if precision projection apparatus is employed.

I am far from desirous of persuading the photographer to spend a big sum of money in a *de luxe* equipment, merely for the satisfaction of pride of possession.

Nor do I wish anyone to infer that an outlay of about £20 is necessary in furnishing apparatus. I shall indicate that a much smaller sum will buy a projection printer with which perfect, big enlargements can be made in comfort.

I advocate the kit first described, or the New Baby Miraphot, because it is almost ideal as regards ease and rapidity of manipulation combined with certainty of results, and entailing the least trouble.

The equipment which I have installed for professional press and commercial, as well as amateur projection enlargements, is the No. 1 Praxidos Enlarger with tall lamp house allowing the use of diffused illumination or condenser direct illumination at will.

But the most cogent reason for installing the Praxidos or Miraphot is that with them one can obtain a magnification eight or ten times linear, automatically. No visual focussing is necessary and therefore no doubt arises as to whether the enlarged image is the sharpest possible obtainable.

With the Praxidos one can make an enlargement about 15 by 10 in. from the small frames of Leica, Contax and Peggy cameras; from 4 by 3 cm. negatives 16 by 12 in.; and from the small Rolleiflex, prints about 16 in. square. With a Miraphot, 12 by 10 or 12 by 12, retaining at these amplifications the quality of the negatives.

In order to ascertain the correct exposure the Largodrem meter, which is coupled up with the flex carrying the electric current, is employed.

Thus, with Praxidos or Miraphot and Largodrem, two indispensable and otherwise difficult and uncertain imperatives—needle-sharp focus and correct exposure—are absolutely ensured without any trouble or waste.

There are several excellent, non-automatic printers allowing of high magnification, and if the miniature camera user adopts one of these he must focus the enlarged image by inspection.

This is best done by first projecting the image on the white paper to the size wanted, focusing this image as sharply as possible, then, removing the strip of film negatives, a piece of blackened film, with a few fine lines scratched through the emulsion, is substituted, and these fine lines focussed dead sharp.

After which, the negatives can be replaced.

Exposure can be determined cheaply, without the Largodrem, by laying a Dremeter on a test piece of bromide or chlorobromide paper and guessing the exposure. When the test piece is developed the correct exposure may be calculated

from the appearance of the rectangular, numbered sections.

The Dremeter costs 2s. 6d. only and is a far better and quicker method of exposure ascertainment than the old-fashioned and laborious way of exposing a sheet of paper in strips.

There is one piece of apparatus for those who use a non-automatic enlarger, which enables dead-sharp focus to be secured without removing the negatives and substituting the blackened film with fine scratches.

This is the Akriscope, which is simply stood upon the baseboard of the enlarger, the eye placed against the eyepiece, and the lens is then focussed until a greatly magnified image of portion of the negative is seen to be needle sharp. Supplied by Messrs. Sands, Hunter and Co., Ltd., 37 Bedford Street, London, W.C.2. Price £2 17s. 6d.

The room in which enlarging is to be done should be as dustless as possible and free from actinic light, illuminated only by the rays from a good safe lamp such as the Wratten.

Dust may settle on the film or the paper, leaving white spots that will demand tedious touching out. Stray actinic light will cause faint fogging and degrade the quality of the print.

The shorter the time in which the bromide or other paper can be exposed, the better. Negatives exposed and developed according to the tenets of this book will require only very short exposures with modern vertical precision enlargers.

If, for the sake of extra contrast, or some special effect, gaslight paper is to be used, the Praxidos can

be fitted with its condenser and the exposure much shortened accordingly. The Miraphot has a condenser permanently fitted.

On the whole, however, there is such a wide range of contrast, surfaces and colour base effects, obtainable on modern bromide and chlorobromide papers, particularly the Ilford series, that gaslight paper is best avoided.

Projection prints made in the way advocated will be, considered purely photographically, nearly perfect. Pictorialists may think them too near perfection as regards sharpness.

If a little diffusion is desired this can be gained most easily and quite satisfactorily, by taking a piece of plain glass such as a cleaned glass plate negative and holding it in the path of the light rays for part of the exposure time, say one-third.

This glass is tilted to and fro occasionally, and as described in Chapter III, it will slightly refract the rays and so soften the edges of the image.

Delightful effects can be obtained also by the employment of the Misonne Screen, invented by M. Leonard Misonne, and costing a few shillings only.

Wise photographers do not jeopardise the quality of their enlargements by using stale or exhausted solutions for developing and fixing. It is true economy to use a fresh acid fixing bath as well as fresh developer every time you make enlargements.

For developing all kinds of bromide paper I have not yet found anything better than Kodak Special Solution. For chlorobromide or gaslight papers it

is necessary to use the developer recommended by the manufacturer, otherwise the final quality and colour of the print is doubtful.

Fifteen by twelve inches or thereabouts will be for nearly every purpose sufficiently large, but the amplification can be much more, while still retaining quality.

I have made enlargements for special display, nearly four feet wide, from negatives obtained on the lines shown in this book.

These " outsize " enlargements are best and most expeditiously made with such an instrument as the Zeiss Ikon Mirette or the Zeiss Ikon Magniphot. These projection printers are not expensive and they do the work admirably. They will, of course, deal equally well with smaller enlargements, and for the miniature photographer who engages in a diversity of work and types of subject, one or other of these models will be found a trustworthy all-round instrument.

Since these big enlargements need a much more prolonged exposure than smaller ones, the most rapid bromide paper is advised, and extra precautions should be taken against stray light in the room.

It will be realised that in making an enlargement three feet wide or more, we are amplifying the image at least twenty times linear or four hundred times the area of the original negative. In such circumstances the grain of the film will be apparent on close inspection.

This graininess can be nullified by a slight diffusion with the piece of glass referred to, and if

the printing is done on a rough surface paper like Kodak Royal, there will be no cause for dissatisfaction.

Developing Projection Prints.—Here is the simple routine of finishing which I follow in my own practice.

For half a dozen 15 by 12 bromide enlargements mix three ounces of Kodak Special Solution with thirty ounces of water and add ten drops of a 10 per cent. Potassium Bromide Solution. Two ounces of Kodak Acid Fixing Salts in twenty-five ounces of water provides a satisfactory fixing bath.

Both solutions are prepared a few hours before use, and together with a supply of pure water are left in the developing room to attain similarity of temperature.

The importance of correct time and temperature in print making seems less generally appreciated than it is in processing films, yet it must be evident that proper development at a temperature favourable to the solution's best activity is requisite for bringing out the richness of deposit and the whole range of beautiful tones obtainable, but not too commonly seen, in enlargements upon modern bromide papers.

Given correct exposure this rich beauty can be realised by full and not too rapid development. This is the reason I recommend a solution a little weaker than that normally indicated by the directions.

We avoid thereby the temptation to remove the print while superficially strong enough, but actually

before the developer has penetrated and built up the image in the lower-lying silver emulsion grains.

For each enlargement a fresh portion, about five ounces, of developer is used and then discarded, so that in the sixth print there is no falling off in quality due to partly exhausted developer and inimical bromo-salts, which contaminate the developer progressively when the same bath is used for a batch of prints.

Development completed, the solution is poured off into the waste-pail and the print, as it lies in the tray, is flooded with water, lifted out and drained, and then dropped into the tray of fixing solution, where it is pushed under the surface with a print paddle and kept there by an occasional application of this very useful and cheap instrument.

A paddle allows one to work without having the fingers coming in contact with the fixing solution, thus avoiding the danger of contaminating paper or developer.

Lantern Slides.—Miniature negatives may, like those of larger dimensions, be printed in contact with standard 3¼ by 3¼ in. lantern diapositive plates, but the diminutive proportions of the frames give a disappointing screen picture by comparison when such slides are interposed among others having the usual picture area of about 2½ by 2¼ in.

For slides which are to be exhibited publicly, as at Photo Society meetings, and therefore among other slides made from larger negatives, the only

alternative is to make them by projection enlargement, getting an image on the lantern plate about $2\frac{3}{4}$ by $2\frac{1}{2}$ or $2\frac{1}{2}$ by $2\frac{1}{2}$ from the whole or best part of the small negative.

Many brands of plates of fine quality are at ones choice, but I find the Ilford Alpha plate unique in its possession of an exceedingly fine grain, a quality which makes it pre-eminent for lantern slides from miniature negatives.

Alpha lantern plates being of a low speed, approximating to gaslight paper, the exposure will be much longer than that called for with rapid lantern plates. It is, therefore, advisable to use Alpha plates only when a condenser enlarger like the Praxidos or Baby Miraphot is installed.

Where the diffusion type is employed, it is preferable to make the slides on the more rapid plates usually recommended for the projection printing of slides.

Many first-class plates of this latter type are made by Ilford, Wellington, Criterion and others.

In using the non-automatic enlargers the same care in exactitude of focussing is, of course, to be observed, as in projection print making. As to finishing, the plates carry with them full instructions and the makers supply free useful booklets on this subject, so that directions are not called for here.

I may add that those who limit their slide exhibitions to home displays will find contact printed slides on the miniature size plates $2\frac{1}{2}$ by $2\frac{1}{2}$ in. satisfactory. These plates are supplied by Zeiss Ikon, who have also a very efficient little lantern

called the Diabox, especially made for displaying sub-standard size positives.

There are also small projection apparatus made by Zeiss Ikon and the Leica people, for showing positives made from Leica, Contax and Peggy negatives, on strips of film. This is an excellent method of showing a series of ones holiday photographs, but it should be recognised that the life of a strip of celluloid positives, if used frequently, is short compared with that of properly made and carefully bound glass lantern slides.

Typical Modern Projection Printers

The Leitz Variable Enlarging Apparatus "Valoy" for use with the interchangeable Leica lenses. Principal features: Film holder for negatives up to 4 by 3 cm. Screw flange for the interchangeable Leica lenses. Large-size illuminating head with centring 75-watt opal bulb for diffused illumination.

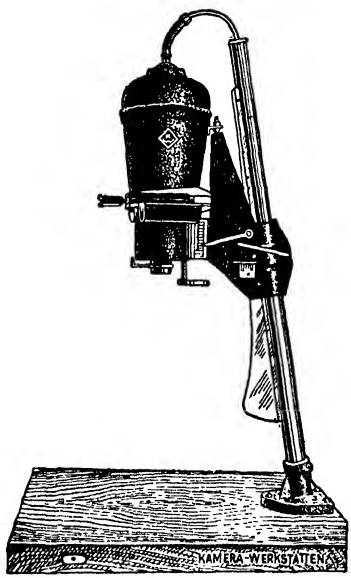
New device for holding the film. The lower plane surface of the illuminating lens is adjustable in height and keeps the film perfectly flat. Highest magnification when using the "Elmar" 5 cm. 8.5 diameters.

E. Leitz, 20 Mortimer Street, London, W.1. Price £7 5s.

New Baby Miraphot. Messrs. Zeiss Ikon Ltd.

An automatic-focussing model taking miniature negatives up to 4 by 3 cm. with a maximum enlargement of 12 by 10 in.

This projection printer has a condenser and a special focussing mount on the lens for giving a slight diffusion or for compensating the focus when lantern plates are being used. Price £10 10s.



The Praxidos "O." Semi-Automatic Focussing Vertical Enlarger. This new semi-automatic enlarger can be set for any degree of enlargement by simply pressing a lever. The lamp-house and negative carrier are automatically locked in position on releasing the lever.

The Praxidos "O" is fitted with F 4.5 anastigmat lens, and sold complete with condenser; it can be used with or without the condenser.

Praxidos "O" Model 1, for 4 by 4 cm. or smaller negatives, giving 1½ to 8 times enlargements, £6 15s.

Fully efficient and giving perfect enlargements up to about 14 by 14 in. according to the size of the miniature negative. Price really moderate for such excellent value.

Thorsch and Co., Ltd., 37 Bedford Street, Strand, London, W.C.2.

Largodrem. Electric Exposure Meter. Price £1 15s. Sands, Hunter and Co., Ltd., 37 Bedford Street, Strand, London, W.C.2.

The Largodrem is simply connected to the electric supply of the enlarger and then shows the absolutely correct exposure time for any kind of paper, any negative, any degree of enlargement and any power of light-source. This is as invaluable in enlarging as the exposure meter in making the original negatives.

Chapter X

BY-PATHS IN MINIATURE PHOTOGRAPHY

OUR adventures are not yet over. Many are the alluring by-paths along which the miniature camera user may wander, discovering fresh charms as he goes.

To some of these a concluding chapter may be appropriately dedicated.

Telephotography with the Leica.—Among the various lenses supplied for use interchangeably with the Leica miniature camera, there are long-focus lenses up to $5\frac{1}{2}$ in. focal length and of large apertures, F 4.5, F 4.9 and F 6.3.

These lenses are of much value in press photography, sporting events and distant-view work.

In actual telephotography, however, it is usual to consider a lens of great focal length with a short back focus relative to the size of film used in the camera.

A lens, for example, about eight times as long in focal length as the actual width of the negative, giving therefore, a magnitude of nearly forty times the area of that given by a normal focal-length lens (i.e. the diameter of the film measured from opposite corners) may be considered a moderately high-power telephoto lens.

Modern photography demands not only fixed separation tele-lenses such as the Dallon, Ross and Cooke, Teletessar and Dynar, it calls for large apertures, F 5.6 and F 4.5, owing to the subjects undertaken, and exquisite defining power, necessary in order that the negatives will bear great enlargement.

Photographers who use a quarter-plate size reflex or hand-stand camera would need, as a moderately high-power tele-lens fulfilling these conditions, one of three feet focal length. This would be impracticable. It would approximate in size to a household pail; it would need a motor car for transportation and it would be prohibitively expensive.

Messrs. Dallmeyer, with their usual foresight, have put into practice their skill and experience in producing a miniature tele-lens working at F 4.5 with irreproachable definition, 12 in. focal length, and adapted for use on the Leica camera.

Its value in some important branches of photography is inestimable to the enthusiast and specialist. Not only is it a delightful acquisition for long-distance landscape idylls, sports photography in comfort from behind the spectators' enclosure is a matter of ease with this lens.

Animals far away and therefore not dangerous to the naturalist or explorer, can be rendered large on the film. Ships distant from the shore offer suitable subjects.

Architectural details, inaccessible otherwise, are perfectly within the scope of the Leica Dallmeyer tele-lens, and the amateur astronomer can obtain excellent photographs of the mountains of the moon.

Negatives taken with this 12 in. focus lens on Leica films, when enlarged about six times, give whole-plate prints equivalent to similar size prints taken direct with a whole-plate field camera and the old-fashioned, slow, separable telephoto lens set for 72 in. focus length.

In the illustration, No. 58, of a Leica fitted with this lens it will be seen that the camera is mounted very firmly on a substantial tripod. Because of the very narrow view angle, the slightest movement of the camera not only throws the image off the film, the faintest tremor of the camera destroys the fine definition of the image, much more so than it does with short-focus lenses.

Hence, when this lens is used, a tripod similar to that illustrated is necessary.

For sighting the subject, Messrs. Dallmeyer supply a monocular Finder, compensated for near objects (not shown in the illustration).

Focussing is effected by a beautifully smooth spiral focussing mount on the lens tubing and is as perfect as one would expect on a Dallmeyer lens.

In calculating the exposure some thought must be given to the nature of the subject. If this is a distant, open view, such as a landscape, over-exposure, beyond minimum meter indication, will result in flat negatives. Usually, with the 2X filter, the minimum meter time is correct.

If the subject is itself very flat without much shadow, half meter time may be given.

For nearer objects, groups taken from a distance unawares and very large head tele-portraits and all those where details and shadowed parts are ren-

dered big on the film, give not more than twice meter indication.

Miniature Stereo Photography.—Next to the fascination and beauty of photographs projected from lantern slides, stereoscopic photographs of close-up subjects, bits of carving, statues, flowers, for example, give hours of pleasure and evoke admiration. One has only to enter an exhibition and observe visitors crowding round the stereo cabinets to realise how attractive "three-dimension" photographs are.

Stereograms can be made with the Leica by attaching the Stereoly, which is merely clamped into the clip above the range finder. The camera is operated precisely in the usual manner, but each frame of 36 by 24 mm. then contains a pair of stereo negatives when developed. See illustration No. 57. The attachment brings a mask in front of the view finder, showing the reduced view angle reaching the film.

Since the prisms incorporated in the Stereoly absorb some of the light before it enters the camera lens, the calculated exposure should be increased by about half when fairly large stops are used. If the lens is stopped down to F 8 or smaller for extra depth or other reason, exposure hardly needs increasing.

No transposing is necessary for positives made with the Stereoly, and these are best made on positive stock film supplied by Messrs. Leitz, who supply also a very handy printing device known as the Eldia.

For viewing the stereos there is a Leica Stereoscope, a very fine little piece of apparatus with adjustable eye-pieces.

Stereo photographs are most pleasing when the subjects possess plenty of depth and detail, and are sharply focussed throughout all the planes. Outdoor views demand a strong foreground object to create the illusion of distance and binocular perspective.

Oriental street scenes offer tempting subjects, vistas along art galleries, groups of statuary and flowers growing naturally, are easy and effective subjects, and zoos are ideal localities for stereo work.

Distant landscapes and clouds are not suitable for stereoscopic photography. Portraits are, but do not snap your subjects laughing or grinning. After seeing in the stereoscope the frozen laugh or fixed grin you will want to destroy the negatives and positives, and if you don't, your victims will want to destroy you.

Panoramic Photography.—While stereograms cannot do justice to distant landscapes and extensive views, panoramic photographs of such subjects are more interesting and impressive than prints of the usual proportions.

There is a Panoramic Tripod Head for use with the Leica and Rolleiflex, which allows of the making of a series of exposures up to a complete circle. Nine frames exposed with the Leica camera in the horizontal position will embrace the whole 360 degrees when the regular 5 cm. focus lens is used, and this is the best focus to employ as a rule.

A scale on the panoramic head allows the sections of the view to be placed accurately on the film. It is very important to keep the camera level when making panorams and a small level is supplied for this purpose.

A full Leica panoramic photograph will be about thirteen inches long by one inch deep. The strip of film is best printed on glossy gaslight paper; one 15 by 12 sheet will cut into ten lengths. Since a 15 by 12 printing frame is somewhat unwieldy for printing these narrow strips, the best way is to make a simple frame of narrow picture moulding about 15 by 2 inches, with a piece of plain glass laid on the rebate.

No hinged back being required, a flat piece of three-ply wood with a strip of smooth rubber glued thereon will keep the film and paper in contact if a bit of brass is screwed at each narrow end of the frame, and turned round to press upon the ends of the wooden panel during exposure.

Complete panoramic negatives being more than a foot long, printing must not be done too close to the light or the ends will be much less exposed than the centre. Three feet distance away will be safe, and the exposure lengthened accordingly.

Panorams are rather a novelty to-day. There is a good market for Leica panorams among the better-class stationers. *Verb. sap.*

Colour Photography.—Now that the Agfa actual-colour roll film is available for all miniature cameras, Leica, Contax, Peggy, as well as the 4 by 3 cm. cameras and the Rolleiflex, the miniature camera

owner can enter this field with the same pleasure and profit as the larger camera user.

Generally, it is considered that colour transparencies are most effective in large sizes, somewhere about half-plate, yet by judiciously selecting ones subjects many things are at hand which will make very pleasing colour miniatures.

Little portrait (close up) colour transparencies, mounted like lantern slides between thin glasses, are a profitable line and eagerly accepted, especially by mothers and fathers of bonny babies.

One or two roses photographed big, make a pretty little colour positive. Commercial travellers can carry a neat case with a large number of these colour miniatures showing the actual tints of such things as dress materials, table ware and crockery, for example. Miniature camera users will see here the wide possibilities for orders if they will take a little trouble to master the process (it is quite easy), make up a specimen case and interview progressive firms.

Agfacolor film, when the compensating normal daylight Filter No. 20 is on the lens may be reckoned as one-thirtieth the speed rating of Agfa Isochrom film.

The best way of arriving at the correct exposure when there is no motion in the subject, and with the camera on a tripod or other support, is to calculate for what stop 1/30 second is correct, and then, setting the Compur shutter to 1 second, give this exposure.

When using the focal-plane shutter of the Leica II or Contax, it must be set to " Time," the push

piece pressed while counting one, two, three, four, five rapidly and releasing at "five." With Leica III, one second can be given automatically.

If hand snapshots are desired of moving objects, a lens of not smaller aperture than F 2.8 or F 2.9 will be necessary for all but the most brilliantly illuminated open views.

Basing the exposure upon Agfa Isochrom film, well-lit fairly open scene, summer sunshine and 1/30 second at F11, the correct exposure on Agfacolor film at F 2.8 works out at 1/15 second. Allowing for the increased light transmission (see Chapter III), 1/25 second with Compur, 1/25 with Contax or 1/20 with Leica shutter, will result in about correct exposure.

But remember, that we are working close to the limit; the subject must be open and well lit with the unclouded sun behind the camera.

The latest batches of Agfacolor film appear to have a greater speed than earlier ones possessed. I have some fully exposed, fairly rapid action, cricketing scenes and angling subjects in not too well-lighted surroundings, which indicate a welcome increase in the rapidity of this excellent film.

Full instructions for processing are supplied with the films.

Appendix A

EXPOSURE PROBLEMS

CORRECT exposure of the film frames in miniature camera photography is a matter of primary importance, and although the great latitude of modern roll films allows of some departure from the exactly correct exposure, the nearer we can approach this condition, the finer the quality of the ultimate enlarged prints.

Exactly correct exposure, while easily ascertainable, is unfortunately not attainable for reasons now to be given.

In the first place, however accurately shutters are made, since they operate under spring tension, by the immutable laws of Physics, this tension must inevitably increase or diminish accordingly as the prevailing temperature of the surroundings falls or rises.

It is fully evident that on a midsummer noonday, when the general atmospheric temperature may be as high as 80° F. to 90° F., expansion of the springs controlling the shutter action must cause these springs to work more slowly than when the camera is being used outdoors on a frosty winter morning with a temperature round about 35° F.

We cannot know by how much the tension varies without an elaborate scientific test beyond the means of most photographers.

Secondly, the light efficiency transmission percentage of all shutters is below 100 per cent. Obviously, in the case of lens shutters, some part of the light coming through the lens, particularly at its outer edge when used without stopping down, is prevented from reaching the film during exposure while the shutter blades are opening and closing.

With focal plane shutters, unless the blind travels across the film in actual contact, and again particularly with a wide-open, large-aperture lens, some portion of the whole beam of light is prevented from reaching the film as the slit in the blind passes over it.

Thirdly, no lens transmits the image-bearing rays in their full strength. The finest of glass used in making modern anastigmat lenses is not perfectly transparent and therefore absorbs some light. The cement used to hold in contact the single elements that compose fully corrected lenses also absorbs some of the light. And there is yet a further loss of light by reflection from every exposed lens surface.

None of these losses is calculable in any practicable manner, but it is generally assumed that loss of light in a compound anastigmat lens is from 30 to 60 per cent. according to the formula of the lens.

Taken cumulatively, all these sources of light suppression present a formidable host in the way of truly correct exposure ever reaching the sensitive film.

These incommensurables, in practice, however, may be disregarded, since the latitude of the film, as stated in the first paragraph, is more than sufficient to nullify them. So what chiefly concerns the

photographer is to calculate, measure, or learn from an electrically controlled automatic meter, what is the correct exposure for the particular subject and prevailing conditions, and then to gratify the film with the nearest possible approach to this indicated exposure.

Instructions issued with exposure calculators and meters usually advise double the reading and they do this in recognition of about 50 per cent. of the light being lost through the causes enumerated. I endorse this advice without contradicting the statement made in Chapter III, that the minimum exposure is the proper one in miniature camera photography.

This minimum applies mostly to outdoor daylight photography when the subject is a fairly open one without strong foreground objects or important cast shadows.

We are now in a position to consider and compare the different devices available for the calculation or ascertainment of correct exposure in negative making.

There are four methods of arriving at correct exposure :

1. *Calculators* such as Wellcome's Diary, Imperial, Agfa, and other similar exposure calculators.
2. *Actinometers* which measure the strength of light by the time taken for a piece of sensitive paper to darken to a standard tint. Well-known examples are Watkins and Wynne meters.
3. *Extinction Meters* of the Drem and Justophot type wherein the subject is viewed through the

meter and the light entering is gradually diminished until extinct.

4. *Electric Meters* entirely automatic in action, in which, on directing the meter towards the subject, the strength of the light reflected therefrom actuates a photo-electric cell, and causes a needle to move over a scale until it comes to rest at some numeral which represents the correct exposure.

In all save the last, the exposure arrived at is subject to ones personal equation in some manner or other. In using a calculator it is left to individual judgment to determine whether the light is brilliant or merely bright, cloudy or cloudy dull, and in the classification of subject it is not always a simple matter to decide between ordinary subject or moderately strong foreground, for example.

Using the Watkins type of meter, there is occasionally some doubt as to when the sensitive paper has darkened to match the painted tint, although this can be made less so by not trying to match the colour, but by comparing the depths. This is accomplished the more easily by holding the meter well away from the eyes, half closing these, and as a further assistance, having a blue-tinted glass over the paper.

With extinction meters the condition of the eye sometimes affects the reading. The same subject would give two entirely different readings to an eye rested in a shady room and one fatigued by an hour's walk in the glare of sunshine.

. All this is not to say that these calculators and

and meters are inefficient; it is merely given as a warning that in their employment a little consideration as to circumstances is necessary and, of course, familiarity will bring content.

On all counts, the independent electric photo meter, notwithstanding its high initial cost, will probably prove cheapest in the end. In scientific pursuits, and modern photography is undoubtedly one of them, the more we can eliminate the personal equation the more accurately can we predetermine the end result.

Calculators are fairly trustworthy guides outdoors when dealing with landscapes, street views and groups where the light from the sky is not appreciably restricted by large masses of foliage or high buildings.

Under verandas, balconies and porches, however, their indications are rather vague, and it is best when photographing groups, for example, under such conditions, to make three or four exposures, giving say, the exposure indicated, twice, and three or four times, since the eye is a poor judge of differences in illumination strength.

Meters which use sensitive paper do measure the actual strength of prevailing light, and their indications are more trustworthy guides than those of calculators, but since the paper used in them is of one standard sensitiveness, while films differ in their reaction to the spectrum constituents of the illuminating source, this factor must not be overlooked.

Panchromatic film responds more to the red end of the spectrum and is therefore much more rapid than other kinds when haze is subduing the blue

end of the spectrum, and the practical increase when using artificial light is about three times the daylight speed; super pan film may safely be reckoned at 8,000 H. and D.

Electric automatic meters used outdoors should not be so directed as to include much sky when taking scenes where foreground groups or important buildings form the main subject, but in landscape work of the pictorial type, before choosing a reading it is necessary to consider the general effect desired.

Few landscapes will attain dignity or spaciousness unless a good expanse of sky is included and it is best to direct the meter first at the sky, note the reading, and next at the important foreground or middle distance feature; note this reading and give an exposure that is the mean of the two.

The illustration, No. 42, "Pastoral," is an example where the sky is the making of the picture, although the chief motive is the sheep. Here the exposure for the sky was indicated as one quarter of that for the sheep. I therefore put a 2X light filter on the lens and gave half the exposure indicated for the sky, thus practising my own preaching, and the result, as I hope the reproduction shows, was entirely satisfactory.

No. 39, "Lake and Sky," a Contax picture, is the type of subject, sky and open, light-reflecting foreground, that demands the minimum exposure in order to retain the delicate gradations, and here again the direction of an electric meter towards the heavens is the proper procedure.

In the winter picture, No. 35, "January," a

subject of strong contrasts, dark near object and white snow, to avoid blocking up the highest lights I gave only twice the exposure indicated for the snow, although the dark foreground masses demanded, according to the meter, ten times as much exposure as the light portions.

Appendix B

COLD WEATHER TROUBLES

MINIATURE cameras with their high-speed lenses of great focal depth, in combination with ultra-rapid films, have made photography easy throughout the year, and during the cold periods their users may find themselves saddled with developing troubles.

Unless measures are taken to counteract the influences of low temperature there will be a serious falling off in the quality of negatives and therefore of enlargements.

Solutions work best and produce the best quality negatives and prints when they are maintained at a temperature of from 60 to 65 deg. F. Since development of films can be carried out in the light-proof tanks anywhere, it is advisable to do so in the living-room rather than a cold attic or outhouse.

A cheap tin tray will prevent any staining of tables and obviate the domestic discord, which seems remarkably and universally aroused at the appearance of an enthusiastic winter photographer in the living-room, carrying his tank and measuring glass.

Where a comfortably warmed dark-room cannot be secured for enlarging it is a good plan to wait until the household has retired for the night, screen

the fire or radiator, and carry on in comfort in solitary possession.

If enlarging must perforce be done in cold quarters, do not use a developer containing hydro-quinone, as this becomes almost inert in such circumstances.

Instead of the Kodak Special Solution previously recommended, Amidol or Azol is preferable for developing bromide papers in cold surroundings.

But photographs have to be taken before a developable film is available, and in cold weather failure to secure good negatives may arise from condensation of moisture on lens surfaces when the camera is brought from a cold room in which it has been kept, to make portraits in a warm sitting-room.

Give the camera a few minutes to warm up to the higher temperature, and to allow all traces of dew to vanish from the lens surfaces.

Out of doors, too, this dewing of lenses has to be guarded against. I once lost a series of valuable rapid-action photographs at a sports meeting through returning my miniature camera to the pocket after each exposure and pulling it out again a minute later for a snap.

I now always keep the camera slung outside my person in cold weather so that its temperature is not subject to sudden variations.

On replacing a cold camera in a warm pocket moisture forms on the lens, and if the instrument is almost immediately withdrawn for a snapshot the moisture will not have time to disappear, hence the negative will be flat and unsharp, with consequent loss of pictures.

Similar precautions should be taken when enlarging, especially where a condenser is used, as in the Baby Miraphot or Praxidos. Switch on the light and give the projector ample time to warm up and the moisture deposit on condenser and projection lens plenty of time to vanish spontaneously.

In cold and damp weather, too, the storage of bromide paper should receive some thought. Damp paper will give flat enlargements, the cause being frequently unsuspected. In winter, the addition of a few extra drops of potassium bromide, 10 per cent. solution, often improves matters, giving increased vigour.

On the whole, if the usual storage place of cameras, enlargers and sensitive materials is a room likely to be damp in winter, it is advisable to remove them for the period into winter quarters where the atmosphere remains fairly dry.

THE END

SELECTED BIBLIOGRAPHY

Perfect Negatives. Dr. B. T. J. Glover -	1s. od.
Agfa Handbook. Dr. Andresen - -	2s. od.
Kodak Holiday Magazine, Summer 1933 -	6d.
Pictorial Photography for Amateurs. Goodsall	5s. od.
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Principles of Photographic Pictorialism. Tilney	25s. od.
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Guide to Successful Portraiture. Goodsall	1s. od.
Free Lance Journalism with a Camera. Mallinson - - - - -	3s. 6d.
Enlarging. Dr. B. T. J. Glover - -	1s. od.
Lantern Slides. Dr. B. T. J. Glover -	1s. od.
Print Perfection. Dr. B. T. J. Glover -	1s. od.

All the books mentioned above are obtainable from :

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19 Cursitor Street, London, E.C.4.